

# UNCLASSIFIED

AD NUMBER
AD220332
NEW LIMITATION CHANGE
TO Approved for public release, distribution unlimited
FROM Distribution authorized to U.S. Gov't. agencies and their contractors; Administrative/Operational Use; AUG 1959. Other requests shall be referred to National Aeronautics and Space Administration, Washington, DC.
AUTHORITY
NASA TR Server website

THIS PAGE IS UNCLASSIFIED

**UNCLASSIFIED**

**AD**

**220332**

FOR  
MICRO-CARD  
CONTROL ONLY

**1**

**OF**

**2**

Reproduced by

**Armed Services Technical Information Agency**

**ARLINGTON HALL STATION; ARLINGTON 12 VIRGINIA**

**UNCLASSIFIED**

**Best  
Available  
Copy**

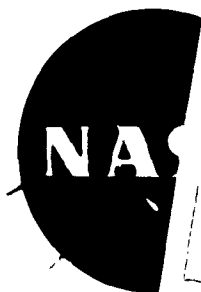
---

**"NOTICE: When Government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the U.S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto."**

NASA TN D-12

NASA TN D-12

FC



FILE COPY

Return to

ASTIA

ARLINGTON HALL STATION  
ARLINGTON 12, VIRGINIA

Attn: T1555

# TECHNICAL NOTE

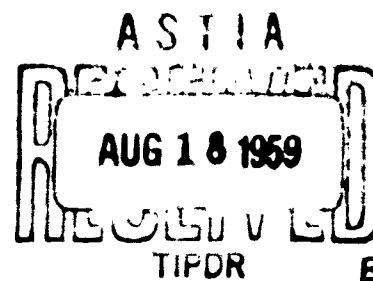
D-12

SOLUTIONS OF THE LAMINAR COMPRESSIBLE BOUNDARY-LAYER  
EQUATIONS WITH TRANSPIRATION WHICH ARE  
APPLICABLE TO THE STAGNATION REGIONS  
OF AXISYMMETRIC ELUNT BODIES

By John T. Howe and William A. Mersman

Ames Research Center  
Moffett Field, Calif.

AD No. AD-220 332  
ASTIA FILE COPY



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON  
August 1959

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

TECHNICAL NOTE D-12

SOLUTIONS OF THE LAMINAR COMPRESSIBLE BOUNDARY-LAYER  
EQUATIONS WITH TRANSPIRATION WHICH ARE  
APPLICABLE TO THE STAGNATION REGIONS  
OF AXISYMMETRIC BLUNT BODIES

By John T. Howe and William A. Mersman

SUMMARY

Solutions of the laminar compressible boundary-layer equations ~~in the Brown and Donoughe form~~ are obtained for Euler number  $1/3$  and Prandtl number at the wall equal to 0.7. Fifteen solutions are presented for various wall-temperature levels and transpiration rates. The solutions are applicable to the stagnation region of axisymmetric bodies by means of the Mangler transformation. ↙

INTRODUCTION

A detailed knowledge of velocity and temperature profiles in the stagnation region of blunt axisymmetric bodies having transpiration is of considerable interest. These profiles can be obtained from two-dimensional wedge flow solutions, in which the Euler number is  $1/3$ , by means of the Mangler transformation. Existing literature presents two-dimensional solutions for Euler numbers smaller and larger than this, but such that interpolation to obtain Euler number  $1/3$  solutions is considered to be inaccurate. In order to obtain accurate profiles for this Euler number, the equations of the two-dimensional laminar compressible boundary layer in the Brown, Donoughe, and Livingood form were integrated numerically. Solutions were obtained for five wall-temperature levels ( $T_e/T_w = 0.25, 0.5, 1, 2, \text{ and } 4$ ), each having three transpiration conditions ( $f_w = 0, -0.5, \text{ and } -1.0$ ).

The purpose of this report is to fill a gap in the existing literature. Therefore, only brief discussions of the theory and method are presented, and the complete numerical results are listed. Transformations to the desired axisymmetric coordinates are given so that local shear stress, heat transfer (as well as their corresponding dimensionless parameters), blowing rates, velocity profiles, and temperature profiles near the stagnation region of a blunt-nosed axisymmetric body can be obtained from the tabulated solutions.

## SYMBOLS

a	constant used in equation (18)
c	an arbitrary constant
$c_f$	local skin-friction coefficient, $\frac{2\tau_w}{\rho_e u_e^2}$
$c_p$	coefficient of specific heat at constant pressure
Eu	Euler number, $-x \frac{\partial p / \partial x}{\rho_e u_e^2}$
f	dimensionless stream function, $\frac{\rho_w \psi}{\sqrt{\mu_w x u_e} \rho_w}$
h	heat-transfer coefficient, $\frac{q_w}{T_w - T_e}$
k	thermal conductivity
L	an arbitrary reference length
Nu	Nusselt number, $\frac{hx}{k_w}$
P	temperature parameter, $\frac{T}{T_w} = 1 + \theta \frac{T_e - T_w}{T_w}$
Pr	Prandtl number, $\frac{c_p \mu}{k}$
q	heat-transfer rate, $-k \frac{\partial T}{\partial y}$
Re	Reynolds number, $\frac{\rho_w u_e x}{\mu_w}$
T	absolute temperature
u	velocity parallel to the wall
v	velocity normal to the wall
x	distance along wall surface from stagnation point
y	distance normal to wall surface

$\alpha$	exponent of temperature in specific-heat relationship
$\epsilon$	exponent of temperature in thermal conductivity relationship
$\eta$	independent variable in transformed boundary-layer equations, $y\sqrt{\rho_w u_e / \mu_w x}$
$\theta$	temperature variable, $\frac{T - T_w}{T_e - T_w}$
$\mu$	coefficient of viscosity
$\rho$	density
$\tau$	shear stress, $\mu \frac{\partial u}{\partial y}$
$\omega$	exponent of temperature in viscosity relationship
$\psi$	stream function defined by equation (9)

#### Subscripts

$e$	local conditions at the outer edge of the boundary layer
$w$	conditions at the wall

#### Superscripts

-	axisymmetric conditions
',",'''	derivatives with respect to $\eta$

#### THEORY

##### The Differential Equations

The two-dimensional partial differential equations describing the physical behavior of the laminar compressible boundary layer are:

$$\frac{\partial}{\partial x} (\rho u) + \frac{\partial}{\partial y} (\rho v) = 0 \quad (1)$$



$$\rho u \frac{\partial u}{\partial x} + \rho v \frac{\partial u}{\partial y} = \frac{\partial}{\partial y} \left( \mu \frac{\partial u}{\partial y} \right) - \frac{\partial p}{\partial x} \quad (2)$$

$$c_p \left( \rho u \frac{\partial T}{\partial x} + \rho v \frac{\partial T}{\partial y} \right) = \frac{\partial}{\partial y} \left( k \frac{\partial T}{\partial y} \right) + \mu \left( \frac{\partial u}{\partial y} \right)^2 + u \frac{\partial p}{\partial x} \quad (3)$$

These equations comprise statements of conservation of mass, the momentum theorem, and conservation of energy, respectively.

The boundary conditions are

at  $y = 0$ ,

$$u = 0, \quad v = v_w(x), \quad T = T_w \quad (4)$$

and at  $y \rightarrow \infty$ ,

$$T \rightarrow T_e, \quad u \rightarrow u_e \quad (5)$$

The partial differential equations (1), (2), and (3) can be transformed to ordinary differential equations having only one independent variable,  $\eta$ , by use of the following relationships introduced by Blasius (ref. 1, p. 135), von Kármán and Tsien (ref. 2), and Pohlhausen (ref. 1, p. 624), respectively.

$$\eta = y \sqrt{\frac{\rho_w u_e}{\mu_w x}} \quad (6)$$

$$\rho_w \psi = f \sqrt{\mu_w x u_e \rho_w} \quad (7)$$

and

$$\theta = \frac{T - T_w}{T_e - T_w} \quad (8)$$

The stream function,  $\psi$ , in equation (7) is defined so that the continuity equation (1) is automatically satisfied; that is,

$$\left. \begin{aligned} \rho u &= \frac{\partial(\rho_w \psi)}{\partial y} \\ \rho v &= - \frac{\partial(\rho_w \psi)}{\partial x} \end{aligned} \right\} \quad (9)$$

and

After certain assumptions and restrictions which will be presented in the next section have been imposed, the two-dimensional partial differential equations, transformed to ordinary differential equations in the manner of Brown, Donoughe, and Livingood (refs. 3, 4, and 5), become

$$f''' = \frac{1}{P^w} \left[ Eu f'^2 - \left( \frac{Eu+1}{2} \right) f f'' - \frac{Eu}{P} \frac{T_v}{T_e} \right] - \frac{1}{P} \left( \frac{T_e}{T_v} - 1 \right) \left[ \left( \frac{Eu+1}{2} \right) \frac{f f' \theta'}{P^w} + f' \theta'' + (w+2) \theta' f'' + \left( \frac{T_e}{T_v} - 1 \right) \frac{w \theta'^2 f'}{P} \right] \quad (10)$$

and

$$\theta'' = - \left[ \left( \frac{Eu+1}{2} \right) Pr_w f \theta' P^{(\alpha-\epsilon)} + \left( \frac{T_e}{T_v} - 1 \right) \frac{\epsilon \theta'^2}{P} \right] \quad (11)$$

The complete derivation of the equations can be found in reference 3.

The boundary conditions for equations (10) and (11) are as follows:

at  $\eta = 0$ ,

$$f' = 0 \quad (12)$$

$$f = f_w \text{ (required to be constant for similarity)} \quad (13)$$

$$\theta = 0 \quad (14)$$

at  $\eta \rightarrow \infty$

$$\theta \rightarrow 1 \quad (15)$$

$$f' \rightarrow \frac{T_v}{T_e} \quad (16)$$

Boundary condition (12) is easily derived by means of the first of boundary conditions (4), the relationship being shown by equation (23). Boundary condition (13) is similarly derived by means of the second of boundary conditions (4), the relationship being shown by equation (25). It is seen from equation (25) that  $f_w$  is a measure of the transpiration rate. Negative values of  $f_w$  correspond to blowing or transpiration. Boundary conditions (14) and (15) are obvious, and (16) is derived by means of the last of boundary conditions (5), the relationships being given by equations (23) and (15).

### Assumptions and Restrictions

The derivation of equations (10) and (11) included certain simplifying assumptions (ref. 3). These will be listed and then discussed in turn.

1. The local Mach number at the outer edge of the boundary layer is small.
2. The Euler number is constant.
3. The wall temperature is constant.
4. Local fluid properties within the boundary layer are proportional to some power of the absolute temperature.

The first assumption makes it possible to omit the dissipative terms (the last two terms in eq. (3)) in the energy equation (see p. 13, ref. 6) because these terms are proportional to Mach number squared. For this same reason,  $T_e$  and  $\rho_v$  are considered to be constant.

The second assumption permits integration of the Euler equation

$$-\frac{\partial p}{\partial x} = \rho_e u_e \frac{du_e}{dx} \quad (17)$$

resulting in

$$u_e = ax^{Eu} \quad (18)$$

Equation (18) and therefore the two-dimensional solutions reported here are of the wedge flow type (ref. 7, p. 128).

A combination of the first and third assumptions allows  $T_e/T_w$  to be treated as a constant in equations (10) and (11).

Although assumption number 4 states a proportional relationship of properties to some power of the absolute temperature, the constants of proportionality never have to be specified. The exponents, however, must be specified in order to integrate the differential equations. The power law relationships are simply

$$\frac{\mu}{\mu_w} = \left(\frac{T}{T_w}\right)^w \quad (19)$$

$$\frac{k}{k_w} = \left(\frac{T}{T_w}\right)^e \quad (20)$$

$$\frac{c_p}{c_{pw}} = \left( \frac{T}{T_w} \right)^{\alpha} \quad (21)$$

$$\frac{\rho}{\rho_w} = \left( \frac{T}{T_w} \right)^{-1} \quad (22)$$

The description of the two-dimensional theory is terminated at this point. A detailed discussion can be found in reference 3. Attention is now directed to a brief discussion of the method of solution, which differs somewhat from that of references 3 through 5.

#### Method of Solution and Specified Numerical Data

Solutions to equations (10) and (11) were obtained by numerical integration using the Adams-Moulton technique (ref. 8, p. 200, eqs. 6.6.2). This is a variable interval method which is especially well suited to this problem. The numerical solutions were computed on the IBM 704 electronic data processing machine.

The boundary conditions (12), (13), and (14) are not sufficient for starting the numerical integration of equations (10) and (11). Values of  $\theta'$  and  $f''$  are also needed at  $\eta = 0$  (i.e.,  $\theta_w'$  and  $f_w''$ ). These have to be estimated for the first attempt to integrate equations (10) and (11). As  $\eta \rightarrow \infty$ , the integration should yield the outer edge boundary conditions (15) and (16). Failure to produce and maintain these values indicates that the estimates for  $\theta_w'$  and  $f_w''$  were in error and new estimates must be made.

In order to facilitate selection of the correct  $\theta_w'$  and  $f_w''$ , three initial trial integrations of a given example were made as follows: the first trial used estimates of  $\theta_w'$  and  $f_w''$ . In the second integration, only  $\theta_w'$  was changed from the first estimate, and in the third integration only  $f_w''$  was changed from the first estimate. The results of these three trial runs yielded values for the partial derivatives of  $\theta$  and  $f'$  at  $\eta = \infty$  with respect to  $f_w''$  and  $\theta_w'$ . Linear interpolation then yielded revised estimates of the starting values,  $f_w''$  and  $\theta_w'$ . The process was then repeated until the correct initial values were obtained thus achieving the proper boundary conditions at  $\eta \rightarrow \infty$ .

Numerical data used for integrating equations (10) and (11) are

$$Pr_w = 0.70$$

$$\omega = 0.70$$

$$\epsilon = 0.85$$

$$\alpha = 0.19$$

These numbers are applicable to air in the temperature range 1060° R to 2860° R according to reference 3. All examples were computed for Euler number 1/3 for reasons which will be presented in the section "Physical Relationships for Axisymmetric Stagnation Regions." Examples were solved for five wall-temperature levels ( $T_e/T_w$  equal to 0.25, 0.5, 1, 2, and 4), each at three different transpiration conditions ( $f_w = 0$ , -0.5, and -1.0).

The numerical results of the integrations appear in tables I through XV. Velocity, temperature, and mass-flow profiles appear in figures 1 through 9. Heat-transfer and skin-friction parameter curves are shown in figures 10 and 11.

#### Physical Relationships for Two-Dimensional Wedge Flows

The following relationships are useful in obtaining values for the physical quantities of interest from the tabulated results. Note that the left-hand sides of both equations (23) and (24) are tabulated in tables I through XV.

$$\frac{u}{u_e} = f' \left[ 1 + \left( \frac{T_e}{T_w} - 1 \right) \theta \right] \quad (\text{ref. 4}) \quad (23)$$

$$\frac{\rho u}{\rho_e u_e} = f' \frac{T_e}{T_w} \quad (\text{ref. 4}) \quad (24)$$

$$(\rho v)_w = - \left( \frac{Eu + 1}{2} \right) f_w \sqrt{\frac{\rho_w \mu_w u_e}{x}} \quad (\text{ref. 3}) \quad (25)$$

$$\tau = \mu \frac{\partial u}{\partial y} = \mu_w \mu_e \sqrt{\frac{\rho_w \mu_w}{\mu_e x}} \left[ 1 + \left( \frac{T_e}{T_w} - 1 \right) \theta \right] \left\{ \left( \frac{T_e}{T_w} - 1 \right) f' \theta' + \left[ \left( \frac{T_e}{T_w} - 1 \right) \theta + 1 \right] f'' \right\} \quad (26)$$

$$\tau_w = u_e f_w'' \sqrt{\frac{\rho_w \mu_w}{x}} = \frac{c_f \rho_e u_e^2}{2} \quad (27)$$

$$c_f \frac{T_w}{T_e} \sqrt{Re} = 2 f_w'' \quad (\text{ref. 4}) \quad (28)$$

$$q_w = -k_w \left( \frac{\partial T}{\partial y} \right)_w = -k_w (T_e - T_w) \theta_w' \sqrt{\frac{\rho_w \mu_w}{x}} \quad (29)$$

$$\frac{Nu}{\sqrt{Re}} = \theta_w' \quad (\text{ref. 4}) \quad (30)$$

It can be seen from equation (25) that because  $f_w$  is specified constant,  $v_w$  is required to vary as  $x^{(Eu-1)/2}$ .

These two-dimensional relationships (eqs. (23) through (30)) applied to the tabulated solutions for  $Eu = 1/3$  (tables I through XV) correspond to the two-dimensional flow over a wedge.

#### Physical Relationships for Axisymmetric Stagnation Regions

Relationships resulting from the Mangler transformation will now be presented (ref. 7, pp. 129 and 168) which make these wedge flow solutions applicable to the stagnation regions of blunt axisymmetric bodies. This transformation is a stretching of the  $x$  and  $y$  coordinates so that the pressure, enthalpy, density, viscosity, and velocity parallel to the surface at the point  $x, y$  in the wedge flow are the same as those at  $\bar{x}, \bar{y}$  in the axisymmetric flow. In the following equations, quantities which apply only to the axisymmetric flow are designated with a bar. Those which apply to the wedge flow (as well as those mentioned above which apply to either flow) are written without a bar. The relationships derived by the Mangler transformation are as follows:

$$\bar{x} = \left( \frac{3L^2 x}{c^2} \right)^{1/3} \quad (31)$$

$$\bar{y} = \frac{L}{c\bar{x}} y \quad (32)$$

$$\bar{\eta} = \frac{1}{\sqrt{3}} \eta \quad (33)$$

$$\bar{Eu} = 3Eu \quad (34)$$

$$\bar{q}_w(\bar{x}) = \frac{c\bar{x}}{L} q_w(x) = -\sqrt{3} k_w (T_e - T_w) \theta_w' \sqrt{\frac{\rho_w \mu_e}{\mu_w \bar{x}}} \quad (35)$$

$$\bar{\tau}(\bar{x}, \bar{y}) = \frac{c\bar{x}}{L} \tau(x, y) = \sqrt{3} \mu_w \mu_e \sqrt{\frac{\rho_w \mu_e}{\mu_w \bar{x}}} \left[ 1 + \left( \frac{T_e}{T_w} - 1 \right) \theta \right] \left\{ \left( \frac{T_e}{T_w} - 1 \right) r' \theta' + \left[ \left( \frac{T_e}{T_w} - 1 \right) \theta + 1 \right] r'' \right\} \quad (36)$$

$$\tau_f \frac{T_w}{T_e} \sqrt{Re} = \sqrt{3} c_f \frac{T_w}{T_e} \sqrt{Re} = 2\sqrt{3} f_w'' \quad (37)$$

$$\frac{\overline{Nu}}{\sqrt{Re}} = \sqrt{3} \frac{Nu}{\sqrt{Re}} = \sqrt{3} \theta_w' \quad (38)$$

$$(\rho \bar{v})_w = \frac{c_f \bar{x}}{L} (\rho v)_w = -\sqrt{3} \left( \frac{Eu+3}{6} \right) f_w \sqrt{\frac{\rho_w \mu_w}{\bar{x}}} \quad (39)$$

$$\frac{\bar{v}_w}{u_e} \sqrt{Re} = -\frac{2f_w}{\sqrt{3}} \quad (40)$$

Because the local Mach number exterior to the boundary layer is assumed to be small, the local exterior flow is considered to be almost incompressible. For the incompressible inviscid flow in the axisymmetric stagnation region, the velocity exterior to the boundary layer is a linear function of  $\bar{x}$  (ref. 7, p. 74, eq. (5.35)); that is, the axisymmetric Euler number ( $\overline{Eu}$ ) is unity in equations (34) and (39). This linear velocity for the axisymmetric stagnation region has also been observed experimentally over a wide range of free-stream Mach numbers. Equation (39) shows that the axisymmetric transpiration velocity,  $\bar{v}_w$ , is constant because  $u_e$  is proportional to  $\bar{x}$ .

The two-dimensional Euler number ( $Eu$ ) is  $1/3$  corresponding to  $\overline{Eu}$  of unity according to equation (34). All of the numerical solutions of equations (10) and (11) presented in this report are for  $Eu$  of  $1/3$  and can be used for the axisymmetric stagnation region. Application of equations (31) through (40) to the solutions in tables I through XV will yield the desired axisymmetric blunt body stagnation region values. Profiles of velocity, mass flow, and temperature for the axisymmetric stagnation region are shown in figures 1 through 9 by using the appropriate ordinate. Heat-transfer and skin-friction parameter curves are presented in figures 10 and 11.

## DISCUSSION

Some features of the solution and numerical results warrant mention.

The cases  $T_e/T_w = 1$  are somewhat special. The physical definition of  $\theta$  (eq. (8)) reveals that either  $\theta$  is infinite or indeterminate for these examples. However, the solutions for  $\theta$  turn out to be finite, as is shown in figures 7, 8, and 9, and listed in tables IV, V, and VI. Therefore  $\theta$ , as defined physically, is actually indeterminate, that is, the temperature,  $T$ , is constant and is equal to  $T_e$  (and  $T_w$ ) across the boundary layer. However,  $\theta$  is defined mathematically by the differential

equation (11) and the boundary conditions (14) and (15), but in this case it has no physical meaning. For this degenerate situation, the second set of brackets in equation (10) is dropped,  $P$  is unity, and the equation reduces to the familiar Falkner and Skan equation (ref. 1, p. 140) for constant property wedge flow conditions.

Examination of figures 1 through 3 and tables I through VI shows a velocity overshoot condition for hot wall cases; that is, the velocity within the boundary layer exceeds that at the outer edge of the boundary layer. This results from the greater acceleration of the less dense hot gas in the boundary layer by a given (favorable) pressure gradient. It is seen that the amount of overshoot increases with increasing wall temperature or blowing rate. References 4 and 5 show that the amount of overshoot increases with Euler number. The two-dimensional flow at  $Eu = 1/3$  passes through the same values of  $u/u_e$  as the axisymmetric flow at  $Eu = 1$ . Then it can be said that for a two-dimensional flow and an axisymmetric flow, both having Euler number unity, the magnitude of the velocity overshoot is smaller in the axisymmetric flow than it is in the two-dimensional flow.

It is interesting to note in figures 4 through 6 and tables X through XV that an overshoot in mass flow occurs. Because of the increased density near a cold wall, this mass-flow overshoot is increased as the wall-temperature level is decreased, in contrast with the behavior of the velocity overshoot condition. However, the amount of mass-flow overshoot increases with blowing rate as was the case with the velocity overshoot condition.

Figure 10 shows that for a given wall-temperature level, transpiration reduces the heat transferred to the wall to a remarkable extent. In particular, for  $T_e/T_w$  equal to 4, the heat-transfer parameter corresponding to transpiration parameter 0.667 is only about one fifth of its value for no transpiration. It is seen that the effectiveness of transpiration in reducing the heat-transfer parameter increases with the transpiration rate and with  $T_e/T_w$ .

As would be expected, figure 11 shows a similar effect of transpiration on skin friction. Quantitatively, for  $T_e/T_w$  equal to 4, the skin-friction parameter corresponding to transpiration parameter 0.667 is only about one third of its value for no transpiration.

#### SUMMARY OF RESULTS

The Brown, Donoughe, and Livingood forms of the laminar compressible boundary-layer equations have been integrated numerically on the IBM 704 electronic data processing machine. Fifteen solutions were obtained for Euler number  $1/3$ , wall Prandtl number 0.7, and for five ratios of local free-stream temperature to wall temperature each at three different



transpiration conditions. These are  $T_e/T_w$  values of 0.25, 0.5, 1, 2, and 4, and transpiration rates corresponding to  $f_w$  of 0, -0.5, and -1.0. The solutions are presented in the forms of tables and graphs.

Relationships are presented by which the tabulated solutions can be applied to stagnation regions of axisymmetric blunt bodies.

The results indicate velocities in the boundary layer greater than the local exterior velocity for hot wall flow situations. The results also indicate local mass flows greater in the boundary layer than exterior to it for cold wall situations. These "overshoot" conditions are accentuated by increased transpiration for both the velocity profiles and the mass-flow profiles.

A large reduction of skin friction and heat transfer is achieved by transpiration. The reduction is greater for situations in which the walls are colder than the local exterior flow.

Ames Research Center  
National Aeronautics and Space Administration  
Moffett Field, Calif., Mar. 20, 1959

#### REFERENCES

1. Goldstein, S.: Modern Developments in Fluid Dynamics. Oxford, The Clarendon Press, 1938.
2. von Kármán, Th., and Tsien, H. S.: Boundary Layer in Compressible Fluids. Jour. Aero. Sci., vol. 5, no. 6, April 1938, pp. 227-232.
3. Brown, W. Byron: Exact Solutions of the Laminar Boundary Layer Equations for a Porous Plate With Variable Fluid Properties and a Pressure Gradient in the Main Stream. Proc. First U. S. Natl. Cong. Appl. Mech., 1952, pp. 843-852.
4. Brown, W. Byron, and Donoughe, Patrick L.: Tables of Exact Laminar-Boundary-Layer Solutions When the Wall is Porous and Fluid Properties are Variable. NACA TN 2479, 1951.
5. Brown, W. Byron, and Livingood, John N. B.: Solutions of Laminar-Boundary-Layer Equations Which Result in Specific-Weight-Flow Profiles Locally Exceeding Free-Stream Values. NACA TN 2800, 1952.

6. Baxter, Donald C., and Flügge-Lotz, Irmgard: The Solution of Compressible Laminar Boundary Layer Problems by a Finite Difference Method. Part 2 - Further Discussion of the Method and Computation of Examples. Tech. Rep. No. 110, Div. of Engineering Mechanics, Stanford Univ., Oct. 1957. (Also Off. of Sci. Res. TN 58-1)
7. Schlichting, H.: Boundary Layer Theory. McGraw-Hill Book Co., 1955.
8. Hildebrand, F. B.: Introduction to Numerical Analysis. McGraw-Hill Book Co., 1956.

TABLE I.-  $T_e/T_w = 0.25$ ,  $r_w = 0$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$cu/pe u_e$
.000	.00000	.000000	1.556297	.045950	.000000	.437659	.122110	.00000	.00000
.005	.00002	.007782	1.556529	.046752	.002190	.438271	.122649	.00777	.00195
.010	.00008	.015565	1.556765	.047564	.004383	.438885	.123185	.01551	.00389
.015	.00018	.023350	1.557004	.048387	.006579	.439503	.123716	.02323	.00584
.020	.00031	.031135	1.557248	.049220	.008778	.440123	.124243	.03093	.00778
.025	.00049	.038922	1.557497	.050063	.010980	.440745	.124766	.03850	.00973
.030	.00070	.046710	1.557749	.050917	.013185	.441370	.125285	.04625	.01168
.040	.00125	.062290	1.558267	.052656	.017605	.442628	.126311	.06147	.01557
.050	.00195	.077876	1.558802	.054438	.022038	.443896	.127319	.07659	.01947
.060	.00280	.093466	1.559356	.056264	.026483	.445175	.128310	.09161	.02337
.070	.00382	.109063	1.559928	.058133	.030941	.446463	.129284	.10653	.02727
.080	.00498	.124665	1.560519	.060048	.035412	.447760	.130239	.12135	.03117
.090	.00631	.140273	1.561129	.062009	.039897	.449067	.131176	.13608	.03507
.110	.00943	.171509	1.562409	.066070	.048904	.451709	.132992	.16522	.04288
.130	.01317	.202770	1.563773	.070324	.057965	.454386	.134729	.19396	.05069
.150	.01754	.234060	1.565224	.074776	.067080	.457098	.136384	.22228	.05852
.170	.02253	.265380	1.566765	.079433	.076249	.459841	.137952	.25020	.06634
.190	.02815	.296731	1.568402	.084302	.085474	.462615	.139429	.27771	.07418
.210	.03440	.328117	1.570139	.089391	.094754	.465418	.140811	.30480	.08203
.250	.04878	.390996	1.573929	.100258	.113484	.471101	.143273	.35772	.09775
.290	.06568	.454037	1.578173	.112098	.132443	.476874	.145299	.40894	.11351
.330	.08511	.517257	1.582911	.124980	.151635	.482718	.146848	.45843	.12931
.370	.10707	.580677	1.588186	.138979	.171062	.488615	.147871	.50618	.14517
.410	.13157	.644319	1.594045	.154172	.190725	.494549	.148319	.55215	.16108
.450	.15862	.708209	1.600537	.170645	.210625	.500472	.148135	.59633	.17705
.530	.22041	.836836	1.615635	.207783	.251135	.512242	.145624	.67922	.20921
.610	.29254	.966796	1.633948	.251126	.292575	.523683	.139785	.75465	.24170
.690	.37514	1.098368	1.656000	.301398	.334907	.534502	.129966	.82248	.27459
.770	.46834	1.231872	1.682373	.359209	.378069	.544351	.115407	.88257	.30797
.850	.57230	1.367679	1.713683	.424851	.421967	.552817	.095238	.93484	.34192
.930	.68724	1.506210	1.750547	.497938	.466470	.559413	.068482	.97926	.37655
.970	.74889	1.576641	1.771238	.497938	.466470	.559413	.068482	.97926	.37655
1.010	.81338	1.647930	1.793509	.536832	.488897	.561836	.052303	.99853	.39416
1.050	.88074	1.720143	1.817392	.576824	.511408	.563570	.034073	1.01586	.41198
1.090	.95100	1.793343	1.842894	.617353	.533973	.564532	.013655	1.03126	.43004
				.657637	.556559	.564632	-.009085	1.04477	.44834

TABLE I.-  $T_e/T_w = 0.25$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/\rho u_e$
1.130	1.02422	1.867596	1.869985	.696608	.579130	.563773	-.034272	1.05641	.46690
1.170	1.10043	1.942962	1.898585	.732851	.601647	.561856	-.062016	1.06623	.48574
1.210	1.17967	2.019501	1.928551	.764523	.624063	.558776	-.092402	1.07428	.50488
1.250	1.26200	2.097261	1.959654	.789272	.646332	.554428	-.125479	1.08062	.52432
1.290	1.34747	2.176284	1.991561	.804163	.668399	.548702	-.161250	1.08531	.54407
1.330	1.43612	2.256591	2.023807	.805601	.690208	.541493	-.199653	1.08845	.56415
1.370	1.52801	2.338185	2.055771	.789298	.711697	.532697	-.240540	1.09012	.58455
1.410	1.62319	2.421038	2.086646	.750282	.732801	.522220	-.283661	1.09043	.60526
1.450	1.72171	2.505088	2.115415	.682995	.753451	.509979	-.328637	1.08949	.62627
1.490	1.82362	2.590224	2.140829	.581502	.773575	.495912	-.374937	1.08742	.64756
1.530	1.92894	2.676290	2.161400	.439870	.793099	.479976	-.421861	1.08437	.66907
1.570	2.03773	2.763050	2.175412	.252734	.811948	.462166	-.468522	1.08046	.69076
1.610	2.14999	2.850209	2.180959	.016070	.830048	.442513	-.513846	1.07585	.71255
1.650	2.26743	2.893822	2.179926	-.016070	.830048	.442513	-.513846	1.07585	.71255
1.690	2.38493	2.937387	2.176014	-.121494	.838794	.432017	-.535622	1.07333	.72346
1.730	2.50766	3.010987	2.162675	-.271852	.847326	.421093	-.556583	1.07069	.73435
1.770	2.63375	3.094044	2.148850	-.434691	.855635	.409760	-.576553	1.06796	.74521
1.790	2.69804	3.235326	2.144519	-.609425	.863714	.398039	-.595349	1.06514	.75603
1.810	2.76316	3.275960	2.014061	-.795171	.871554	.385955	-.612786	1.06226	.76679
1.830	2.82908	3.315859	1.975185	-.990731	.879150	.373538	-.628680	1.05934	.77747
1.850	2.89578	3.354939	1.932031	-1.194578	.886494	.360820	-.642852	1.05640	.78805
1.870	2.96327	3.393113	1.884702	-1.404864	.893581	.347837	-.655130	1.05344	.79851
1.890	3.03150	3.430300	1.833363	-1.619426	.900406	.334628	-.665353	1.05050	.80883
1.910	3.10047	3.466422	1.778237	-1.835821	.906965	.321237	-.673378	1.04757	.81899
1.930	3.17015	3.501406	1.719606	-2.051364	.913254	.307709	-.679079	1.04469	.82896
1.950	3.24052	3.535185	1.657805	-2.263190	.919272	.294090	-.682357	1.04186	.83873
1.970	3.31155	3.567700	1.593217	-2.468319	.925018	.280431	-.683136	1.03910	.84828
1.990	3.38322	3.598898	1.526267	-2.663742	.930490	.266781	-.681379	1.03641	.85758
2.010	3.45550	3.628738	1.457411	-2.846507	.935689	.253193	-.677069	1.03380	.86661
2.030	3.52836	3.657185	1.387128	-3.013811	.940618	.239715	-.670230	1.03129	.87535
2.050	3.60178	3.684214	1.315910	-3.163094	.945279	.226400	-.660920	1.02888	.88380
				-3.292121	.949676	.213295	-.649229	1.02658	.89192
				-3.399053	.953812	.200446	-.635280	1.02439	.89972
				-3.482513	.957695	.187897	-.619227	1.02232	.90718
				-3.544165	.961331	.175690	-.601248	1.02036	.91430
				-3.575993	.964725	.163859	-.581543	1.01852	.92105

TABLE I.-  $T_e/T_W = 0.25$ ,  $f_W = 0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/pe u_e$
2.070	3.67572	3.709819	1.244251	-3.585794	.967888	.152438	-.560333	1.01680	.92745
2.090	3.75016	3.733987	1.172637	-3.571661	.970826	.141454	-.537849	1.01520	.93350
2.110	3.82507	3.756728	1.101537	-3.534685	.973549	.130931	-.514329	1.01371	.93918
2.130	3.90042	3.778055	1.031392	-3.476357	.976066	.120886	-.490014	1.01233	.94451
2.150	3.97618	3.797993	.962612	-3.398501	.978388	.111334	-.465143	1.01106	.94950
2.170	4.05233	3.816571	.895568	-3.303196	.980523	.102283	-.439948	1.00989	.95414
2.190	4.12884	3.833829	.830585	-3.192701	.982482	.093737	-.414649	1.00883	.95846
2.210	4.20567	3.849810	.767945	-3.069381	.984276	.085696	-.389451	1.00785	.96245
2.230	4.28282	3.864564	.707879	-2.935635	.985914	.078157	-.364543	1.00697	.96614
2.250	4.36025	3.878144	.650573	-2.793829	.987405	.071111	-.340096	1.00617	.96954
2.270	4.43794	3.890606	.596165	-2.646244	.988761	.064549	-.316258	1.00545	.97265
2.290	4.51587	3.902010	.544748	-2.495025	.989990	.058456	-.293158	1.00480	.97550
2.310	4.59401	3.912416	.496375	-2.342152	.991102	.052817	-.270903	1.00421	.97810
2.330	4.67236	3.921886	.451061	-2.189412	.992106	.047614	-.249579	1.00369	.98047
2.350	4.75088	3.930479	.408787	-2.038380	.993010	.042827	-.229255	1.00323	.98262
2.370	4.82957	3.938257	.369506	-1.890419	.993822	.038437	-.209977	1.00281	.98456
2.390	4.90841	3.945279	.333143	-1.746677	.994550	.034421	-.191779	1.00245	.98632
2.410	4.98738	3.951602	.299605	-1.608091	.995201	.030758	-.174674	1.00212	.98790
2.430	5.06647	3.957281	.268780	-1.475406	.995782	.027427	-.158667	1.00184	.98932
2.450	5.14566	3.962370	.240546	-1.349178	.996300	.024404	-.143746	1.00159	.99059
2.470	5.22496	3.966919	.214768	-1.229802	.996760	.021670	-.129892	1.00137	.99173
2.490	5.30434	3.970976	.191307	-1.117524	.997169	.019202	-.117076	1.00118	.99274
2.510	5.38379	3.974586	.170019	-1.012459	.997530	.016980	-.105263	1.00101	.99365
2.530	5.46332	3.977790	.150760	-.914613	.997849	.014985	-.094411	1.00086	.99445
2.550	5.54290	3.980629	.133387	-.823898	.998131	.013197	-.084475	1.00074	.99516
2.570	5.62254	3.983137	.117758	-.740152	.998379	.011600	-.075406	1.00063	.99578
2.590	5.70223	3.985350	.103736	-.663145	.998596	.010176	-.067155	1.00053	.99634
2.610	5.78195	3.987297	.091189	-.592606	.998787	.008909	-.059669	1.00045	.99682
2.630	5.86172	3.989006	.079991	-.528224	.998953	.007784	-.052899	1.00038	.99725
2.650	5.94151	3.990505	.070021	-.469666	.999099	.006788	-.046792	1.00032	.99763
2.670	6.02134	3.991815	.061168	-.416580	.999226	.005908	-.041299	1.00027	.99795
2.690	6.10118	3.992958	.053324	-.368609	.999336	.005133	-.036371	1.00023	.99824
2.710	6.18105	3.993954	.046392	-.325393	.999432	.004450	-.031962	1.00019	.99849
2.730	6.26094	3.994819	.040279	-.286576	.999514	.003851	-.028027	1.00016	.99870
2.770	6.42076	3.996220	.030182	-.220767	.999648	.002867	-.021415	1.00011	.99905
2.810	6.58063	3.997265	.022438	-.168555	.999747	.002119	-.016227	1.00007	.99932

TABLE I.-  $T_e/T_w = 0.25$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/poe$
2.850	6.74054	3.998039	.016549	-.127566	.999820	.001554	-.012194	1.000005	.99951
2.890	6.90047	3.998608	.012110	-.095708	.999873	.001131	-.009088	1.000003	.99965
2.930	7.06043	3.999023	.008793	-.071195	.999912	.000817	-.006718	1.000002	.99976
2.970	7.22039	3.999323	.006336	-.052513	.999940	.000586	-.004926	1.000001	.99983
3.010	7.38037	3.999539	.004530	-.038409	.999960	.000417	-.003583	1.000001	.99988
3.050	7.54036	3.999693	.003214	-.027860	.999974	.000294	-.002585	1.000000	.99992
3.090	7.70035	3.999801	.002264	-.020041	.999984	.000206	-.001851	1.000000	.99995
3.130	7.86034	3.999877	.001582	-.014298	.999991	.000144	-.001314	1.000000	.99997
3.170	8.02034	3.999931	.001098	-.010117	.999995	.000099	-.000926	1.000000	.99998
3.210	8.18033	3.999967	.000757	-.007100	.999999	.000068	-.000647	1.000000	.99999
3.250	8.34033	3.999993	.000518	-.004942	1.000001	.000046	-.000449	1.000000	1.00000
3.290	8.50033	4.000010	.000352	-.003413	1.000002	.000031	-.000309	1.000000	1.00000
3.330	8.66033	4.000021	.000238	-.002338	1.000003	.000021	-.000211	1.000000	1.00001
3.370	8.82034	4.000029	.000161	-.001588	1.000004	.000014	-.000143	.999999	1.00001
3.410	8.98034	4.000035	.000108	-.001070	1.000005	.000009	-.000096	.999999	1.00001
3.450	9.14034	4.000038	.000073	-.000715	1.000005	.000006	-.000064	.999999	1.00001
3.490	9.30034	4.000041	.000049	-.000474	1.000005	.000004	-.000042	.999999	1.00001
3.530	9.46034	4.000042	.000034	-.000312	1.000005	.000003	-.000028	.999999	1.00001
3.570	9.62034	4.000043	.000023	-.000203	1.000005	.000002	-.000018	1.000000	1.00001
3.610	9.78034	4.000044	.000017	-.000132	1.000005	.000001	-.000012	1.000000	1.00001
3.650	9.94035	4.000045	.000012	-.000085	1.000005	.000001	-.000007	1.000000	1.00001
3.690	10.10035	4.000045	.000010	-.000053	1.000005	.000000	-.000005	1.000000	1.00001
3.730	10.26035	4.000046	.000008	-.000034	1.000005	.000000	-.000003	1.000000	1.00001
3.810	10.58035	4.000046	.000006	-.000013	1.000005	.000000	-.000001	1.000000	1.00001
3.890	10.90036	4.000047	.000006	-.000005	1.000005	.000000	-.000000	1.000000	1.00001

TABLE II.-  $T_e/T_w = 0.25$ ,  $f_w = -0.5$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
.000	-.50000	.000000	1.369742	-.004999	.000000	.314289	.136305	.00000	.00000
.005	-.49998	.006849	1.369719	-.004501	.001573	.314972	.136868	.00684	.00171
.010	-.49993	.013697	1.369697	-.003998	.003150	.315658	.137429	.01366	.00342
.015	-.49985	.020546	1.369679	-.003489	.004730	.316347	.137990	.02047	.00514
.020	-.49973	.027394	1.369663	-.002974	.006313	.317038	.138549	.02726	.00685
.025	-.49957	.034242	1.369649	-.002452	.007900	.317732	.139107	.03404	.00856
.030	-.49938	.041090	1.369638	-.001925	.009491	.318429	.139663	.04080	.01027
.040	-.49890	.054787	1.369624	-.000852	.012682	.319831	.140772	.05427	.01370
.050	-.49829	.068483	1.369621	.000246	.015887	.321245	.141876	.06767	.01712
.060	-.49753	.082179	1.369629	.001369	.019107	.322669	.142974	.08100	.02054
.070	-.49664	.095876	1.369649	.002518	.022341	.324104	.144065	.09427	.02397
.080	-.49562	.109572	1.369680	.003694	.025589	.325550	.145151	.10747	.02739
.090	-.49445	.123269	1.369723	.004895	.028952	.327007	.146230	.12060	.03082
.110	-.49171	.150665	1.369845	.007380	.035421	.329953	.148369	.14666	.03767
.130	-.48843	.178063	1.370019	.009976	.042050	.332942	.150478	.17245	.04452
.150	-.48459	.205466	1.370245	.012687	.048739	.335972	.152557	.19796	.05137
.170	-.48021	.232874	1.370527	.015517	.055489	.339044	.154604	.22318	.05822
.190	-.47528	.260287	1.370866	.018470	.062301	.342156	.156614	.24813	.06507
.210	-.46980	.287709	1.371266	.021549	.069176	.345308	.158587	.27278	.07193
.250	-.45719	.342578	1.372258	.028108	.083116	.351728	.162410	.32122	.08564
.290	-.44239	.397493	1.373323	.035231	.097316	.358298	.166049	.36848	.09937
.330	-.42539	.452464	1.375084	.042957	.111782	.365010	.169479	.41453	.11312
.370	-.40619	.507504	1.376968	.051333	.126519	.371853	.172673	.45935	.12688
.410	-.38479	.562626	1.379200	.060406	.141532	.378820	.175601	.50290	.14066
.450	-.36118	.617845	1.381810	.070228	.156826	.385898	.178232	.54517	.15446
.530	-.30732	.728637	1.388291	.092355	.188273	.400335	.182453	.62575	.18216
.610	-.24458	.840023	1.396687	.118229	.220887	.415046	.185011	.70086	.21001
.690	-.17290	.952167	1.407323	.148447	.254683	.429882	.185520	.77029	.23804
.770	-.09221	1.065264	1.420573	.183688	.289666	.444662	.183526	.83384	.26632
.850	-.00243	1.179540	1.436868	.224701	.325822	.459165	.178497	.89130	.29488
.930	.09656	1.295257	1.456700	.272266	.363118	.473124	.169815	.94251	.32381
1.010	.20486	1.412721	1.480625	.327120	.401499	.486219	.156763	.98732	.35318
1.090	.32265	1.532283	1.509248	.389802	.440880	.498068	.138526	1.02562	.38307
1.170	.45009	1.654344	1.543204	.460385	.481144	.508220	.114185	1.05736	.41359
1.210	.51751	1.716450	1.562374	.498427	.501561	.512498	.099416	1.07077	.42911
1.250	.58742	1.779354	1.583099	.538014	.522136	.516148	.082741	1.08256	.44484

TABLE II.-  $T_e/T_w = 0.25$ ,  $f_w = -0.5$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/peu_e$
1.290	.65987	1.843120	1.605431	.578770	.542843	.519090	.064028	1.09273	.46078
1.330	.73488	1.907811	1.629408	.620147	.563652	.521241	.043148	1.10130	.47695
1.370	.81250	1.973494	1.655041	.661372	.584531	.522512	.019977	1.10832	.49337
1.410	.89278	2.040236	1.682302	.701396	.605440	.522808	-.005598	1.11381	.51006
1.450	.97574	2.108099	1.711117	.738823	.626341	.522031	-.033672	1.11781	.52702
1.490	1.06144	2.177144	1.741348	.771844	.647187	.520080	-.064314	1.12038	.54429
1.530	1.14993	2.247423	1.772775	.798153	.667930	.516851	-.097555	1.12158	.56186
1.570	1.24125	2.318978	1.805072	.814884	.688517	.512241	-.133376	1.12149	.57974
1.610	1.33546	2.391835	1.837790	.818544	.708390	.506148	-.171692	1.12017	.59796
1.650	1.43261	2.465999	1.870325	.804992	.728987	.498475	-.212333	1.11774	.61650
1.690	1.53276	2.541448	1.901895	.769462	.748745	.489134	-.255026	1.11427	.63536
1.730	1.63595	2.618124	1.931517	.706668	.768095	.478051	-.299373	1.10990	.65453
1.770	1.74222	2.695927	1.957990	.611037	.786965	.465169	-.344829	1.10473	.67398
1.810	1.85163	2.774702	1.979889	.477076	.805284	.450459	-.390689	1.09888	.69368
1.850	1.96421	2.854235	1.995581	.299927	.822978	.433921	-.436074	1.09251	.71356
1.890	2.07998	2.934241	2.003262	.076104	.839974	.415594	-.479938	1.08573	.73356
1.910	2.13906	2.974313	2.003505	-.053810	.848188	.405784	-.500929	1.08222	.74358
1.930	2.19895	3.014363	2.001030	-.195630	.856202	.395562	-.521079	1.07868	.75359
1.950	2.25964	3.054335	1.995603	-.349004	.864008	.384947	-.540222	1.07511	.76358
1.970	2.32112	3.094166	1.986997	-.513326	.871598	.373961	-.558185	1.07151	.77354
1.990	2.38340	3.133792	1.975003	-.687718	.878964	.362629	-.574799	1.06792	.78345
2.010	2.44647	3.173142	1.959430	-.871010	.886101	.350979	-.589892	1.06435	.79329
2.030	2.51033	3.212144	1.940113	-1.061738	.893002	.339045	-.603301	1.06081	.80304
2.050	2.57496	3.250721	1.916923	-1.258148	.899661	.326860	-.614871	1.05731	.81268
2.070	2.64035	3.288795	1.889763	-1.458209	.906075	.314463	-.624458	1.05387	.82220
2.090	2.70650	3.326285	1.858585	-1.659649	.912238	.301895	-.631935	1.05051	.83157
2.110	2.77340	3.363111	1.823385	-1.859987	.918150	.289200	-.637195	1.04723	.84078
2.130	2.84102	3.399194	1.784211	-2.056594	.923806	.276423	-.640152	1.04405	.84980
2.150	2.90936	3.434454	1.741164	-2.246758	.929206	.263610	-.640749	1.04097	.85861
2.170	2.97840	3.468816	1.694402	-2.427751	.934350	.250809	-.638954	1.03800	.86720
2.190	3.04811	3.502207	1.644133	-2.596915	.939239	.238068	-.634767	1.03515	.87555
2.210	3.11848	3.534559	1.590621	-2.751741	.943874	.225434	-.628217	1.03243	.88364
2.230	3.18948	3.565812	1.534174	-2.889946	.948257	.212954	-.619367	1.02983	.89145
2.250	3.26110	3.595909	1.475147	-3.009551	.952393	.200674	-.608307	1.02737	.89898
2.270	3.33331	3.624803	1.413927	-3.108935	.956286	.188636	-.595157	1.02504	.90620
2.290	3.40609	3.652454	1.350931	-3.186894	.959941	.176881	-.580065	1.02285	.91311



TABLE II.-  $T_e/T_w = 0.25$ ,  $f_w = -0.5$ ,  $Eu = 1/3$  - Continued

$\gamma$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho u_e$
2.310	3.47940	3.678832	1.286598	-3.242664	.963363	.165445	-.563200	1.02079	.91971
2.330	3.55323	3.703912	1.221374	-3.275941	.966561	.154263	-.544751	1.01887	.92598
2.350	3.62755	3.727684	1.155709	-3.286877	.969540	.143664	-.524921	1.01708	.93192
2.370	3.70233	3.750141	1.090044	-3.276059	.972310	.133374	-.503925	1.01542	.93754
2.390	3.77755	3.771288	1.024804	-3.244471	.974878	.123514	-.481984	1.01388	.94282
2.410	3.85317	3.791139	.960394	-3.193449	.977254	.114099	-.459319	1.01246	.94778
2.430	3.92918	3.809712	.897185	-3.124620	.979445	.105144	-.436149	1.01116	.95243
2.450	4.00555	3.827036	.835515	-3.039839	.981462	.096655	-.412686	1.00997	.95676
2.470	4.08226	3.843145	.775684	-2.941120	.983315	.088637	-.389130	1.00888	.96079
2.490	4.15927	3.858078	.717949	-2.830575	.985011	.081090	-.365671	1.00789	.96452
2.510	4.23657	3.871878	.662525	-2.710344	.986561	.074009	-.342480	1.00699	.96797
2.530	4.31414	3.884595	.609586	-2.582547	.987974	.067388	-.319712	1.00618	.97115
2.550	4.39197	3.896279	.559260	-2.449230	.989260	.061217	-.297505	1.00545	.97407
2.570	4.46998	3.906983	.511640	-2.312325	.990426	.055483	-.275975	1.00480	.97675
2.590	4.54822	3.916763	.466779	-2.173621	.991482	.050172	-.255222	1.00421	.97919
2.610	4.62665	3.925673	.424697	-2.034740	.992436	.045268	-.235325	1.00369	.98142
2.630	4.70524	3.933769	.385382	-1.897120	.993295	.040753	-.216345	1.00322	.98344
2.650	4.78399	3.941107	.348796	-1.762012	.994068	.036608	-.198330	1.00281	.98528
2.670	4.86288	3.947739	.314878	-1.630478	.994762	.032813	-.181308	1.00244	.98693
2.690	4.94190	3.953719	.283547	-1.503397	.995383	.029349	-.165294	1.00212	.98843
2.710	5.02103	3.959097	.254708	-1.381467	.995938	.026195	-.150293	1.00184	.98977
2.730	5.10026	3.963923	.228251	-1.265230	.996433	.023331	-.136296	1.00159	.99098
2.750	5.17958	3.968242	.204058	-1.155072	.996873	.020737	-.123286	1.00137	.99206
2.770	5.25899	3.972100	.182006	-1.051247	.997264	.018393	-.111237	1.00118	.99302
2.790	5.33846	3.975536	.161965	-.953893	.997610	.016281	-.100118	1.00101	.99388
2.810	5.41800	3.978591	.143807	-.863043	.997917	.014382	-.089892	1.00086	.99465
2.830	5.49760	3.981300	.127401	-.778644	.998187	.012680	-.080518	1.00074	.99532
2.850	5.57725	3.983698	.112619	-.700571	.998425	.011156	-.071953	1.00063	.99592
2.870	5.65695	3.985815	.099337	-.628641	.998634	.009796	-.064150	1.00054	.99645
2.890	5.73668	3.987680	.087434	-.562623	.998818	.008585	-.057062	1.00046	.99692
2.910	5.81646	3.989321	.076795	-.502251	.998978	.007509	-.050644	1.00039	.99733
2.930	5.89626	3.990760	.067309	-.447237	.999119	.006556	-.044847	1.00033	.99769
2.950	5.97608	3.992020	.058872	-.397271	.999241	.005712	-.039627	1.00028	.99800
2.970	6.05594	3.993121	.051386	-.352036	.999348	.004967	-.034938	1.00023	.99828
2.990	6.13581	3.994081	.044761	-.311213	.999441	.004311	-.030737	1.00020	.99852
3.010	6.21570	3.994917	.038910	-.274479	.999521	.003734	-.026984	1.00016	.99873

TABLE II.-  $T_e/T_W = 0.25$ ,  $f_W = -0.5$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u / \rho u_e$
3.050	6.37552	3.996271	.029227	-.212044	.999651	.002786	-.020665	1.00011	.99907
3.090	6.53540	3.997284	.021778	-.162340	.999747	.002063	-.015693	1.00008	.99932
3.130	6.69530	3.998037	.016100	-.123194	.999818	.001517	-.011820	1.00005	.99951
3.170	6.85524	3.998591	.011808	-.092674	.999870	.001106	-.008829	1.00004	.99965
3.210	7.01519	3.998996	.008592	-.069118	.999908	.000801	-.006541	1.00003	.99975
3.250	7.17515	3.999289	.006203	-.051111	.999935	.000575	-.004807	1.00002	.99982
3.290	7.33513	3.999501	.004443	-.037478	.999955	.000410	-.003504	1.00001	.99988
3.330	7.49511	3.999651	.003158	-.027252	.999969	.000290	-.002534	1.00001	.99991
3.370	7.65510	3.999758	.002227	-.019652	.999978	.000204	-.001818	1.00000	.99994
3.410	7.81509	3.999833	.001558	-.014055	.999985	.000142	-.001294	1.00000	.99996
3.450	7.97509	3.999885	.001082	-.009969	.999990	.000098	-.000914	1.00000	.99997
3.490	8.13508	3.999922	.000745	-.007013	.999993	.000068	-.000640	1.00000	.99998
3.530	8.29508	3.999947	.000509	-.004893	.999996	.000046	-.000445	1.00000	.99999
3.570	8.45508	3.999963	.000345	-.003387	.999997	.000031	-.000307	1.00000	.99999
3.610	8.61508	3.999975	.000232	-.002325	.999998	.000021	-.000210	1.00000	.99999
3.650	8.77508	3.999982	.000154	-.001583	.999999	.000014	-.000142	1.00000	1.00000
3.690	8.93508	3.999987	.000102	-.001069	.999999	.000009	-.000096	1.00000	1.00000
3.730	9.09508	3.999991	.000066	-.000716	1.000000	.000006	-.000064	1.00000	1.00000
3.770	9.25508	3.999993	.000043	-.000476	1.000000	.000004	-.000042	1.00000	1.00000
3.810	9.41508	3.999994	.000027	-.000314	1.000000	.000003	-.000028	1.00000	1.00000
3.850	9.57508	3.999995	.000017	-.000205	1.000000	.000002	-.000018	1.00000	1.00000
3.890	9.73508	3.999996	.000010	-.000133	1.000000	.000001	-.000012	1.00000	1.00000
3.930	9.89508	3.999996	.000006	-.000086	1.000000	.000001	-.000008	1.00000	1.00000
3.970	10.05508	3.999996	.000003	-.000055	1.000000	.000000	-.000005	1.00000	1.00000
4.050	10.37507	3.999996	.000000	-.000022	1.000000	.000000	-.000002	1.00000	1.00000
4.130	10.69507	3.999996	-.000001	-.000008	1.000000	.000000	-.000001	1.00000	1.00000

TABLE III.-  $T_e/T_w = 0.25$ ,  $f_w = -1.0$ ,  $Eu = 1/3$

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/pe u_e$
.000	-1.00000	.000000	1.194912	-.024859	.000000	.211541	.127247	.000000	.00000
.005	-.99999	.005974	1.194788	-.024571	.001059	.212179	.127790	.00597	.00149
.010	-.99994	.011948	1.194666	-.024279	.002122	.212819	.128334	.01193	.00299
.015	-.99987	.017921	1.194545	-.023984	.003187	.213462	.128878	.01788	.00448
.020	-.99976	.023893	1.194426	-.023686	.004256	.214108	.129422	.02382	.00597
.025	-.99963	.029865	1.194309	-.023384	.005329	.214757	.129967	.02975	.00747
.030	-.99946	.035836	1.194192	-.023079	.006404	.215408	.130512	.03566	.00896
.040	-.99904	.047777	1.193965	-.022458	.008555	.216718	.131504	.04747	.01194
.050	-.99851	.059716	1.193743	-.021824	.010738	.218040	.132697	.05923	.01493
.060	-.99785	.071652	1.193528	-.021175	.012925	.219372	.133792	.07096	.01791
.070	-.99707	.083586	1.193320	-.020511	.015126	.220716	.134888	.08264	.02090
.080	-.99618	.095519	1.193118	-.019833	.017340	.222070	.135985	.09428	.02388
.090	-.99516	.107449	1.192923	-.019140	.019567	.223435	.137083	.10587	.02686
.110	-.99276	.131303	1.192555	-.017709	.024064	.226199	.139282	.12893	.03283
.130	-.98991	.155151	1.192215	-.016215	.028616	.229007	.141484	.15182	.03879
.150	-.98657	.178992	1.191906	-.014657	.033224	.231858	.143687	.17453	.04475
.170	-.98275	.202828	1.191629	-.013032	.037890	.234754	.145890	.19706	.05071
.190	-.97846	.226658	1.191386	-.011339	.042615	.237694	.148093	.21941	.05666
.210	-.97369	.250483	1.191176	-.009575	.047398	.240678	.150294	.24158	.06262
.250	-.96271	.298124	1.190867	-.005825	.057147	.246778	.154683	.28535	.07453
.290	-.94984	.345755	1.190715	-.001763	.067143	.253052	.159045	.32834	.08644
.330	-.93505	.393383	1.190731	.002632	.077393	.259501	.163369	.37055	.09835
.370	-.91836	.441016	1.190930	.007386	.087905	.266121	.167637	.41194	.11025
.410	-.89977	.488660	1.191327	.012521	.098685	.272911	.171836	.45249	.12217
.450	-.87927	.536325	1.191937	.018068	.109740	.279867	.175945	.49218	.13408
.530	-.83255	.631750	1.193868	.030515	.132701	.294261	.183819	.56887	.15794
.610	-.77819	.727372	1.196874	.045004	.156838	.309261	.191080	.64181	.18184
.690	-.71616	.823283	1.201132	.061863	.182198	.324811	.197513	.71078	.20582
.770	-.64645	.919592	1.206846	.081484	.208821	.340835	.202865	.77557	.22990
.850	-.56901	1.016424	1.214255	.104334	.236741	.357233	.206841	.83595	.25411
.930	-.48380	1.113926	1.223640	.130960	.265985	.373883	.209089	.89171	.27848
1.010	-.39076	1.212268	1.235327	.162002	.296565	.390630	.209203	.94263	.30307
1.090	-.28981	1.311650	1.249598	.198193	.328483	.407286	.206708	.98851	.32791
1.170	-.18087	1.412303	1.267197	.240345	.361722	.423619	.201053	1.02916	.35308
1.250	-.06380	1.514498	1.288336	.289317	.396246	.439353	.191602	1.06441	.37862
1.330	.06150	1.618549	1.313692	.345928	.433194	.454155	.177629	1.09415	.40464

TABLE III.-  $T_e/T_w = 0.25$ ,  $f_w = -1.0$ ,  $F_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$p_{01}/p_{01e}$
1.410	1.9522	1.724819	1.343904	.410804	.468875	.467631	.158313	1.11828	.43120
1.490	.33754	1.833722	1.379644	.484092	.506767	.479318	.132740	1.13677	.45843
1.530	.41200	1.889306	1.399794	.523694	.526042	.484325	.117303	1.14392	.47233
1.570	.48870	1.945727	1.421563	.564981	.545504	.488676	.099930	1.14968	.48643
1.610	.56767	2.003053	1.445010	.607574	.565126	.492292	.080495	1.15407	.50076
1.650	.64896	2.061351	1.470178	.650910	.584877	.495087	.058876	1.15712	.51534
1.690	.73260	2.120690	1.497082	.694200	.604721	.496971	.034957	1.15887	.53017
1.730	.81863	2.181140	1.525699	.736364	.624621	.497851	.008638	1.15935	.54529
1.770	.90710	2.242768	1.555957	.775971	.644534	.497629	-.020163	1.15861	.56069
1.810	.99807	2.305637	1.587717	.811160	.664415	.496205	-.051495	1.15671	.57641
1.850	1.09157	2.369803	1.620758	.839574	.684213	.493476	-.085371	1.15372	.59245
1.890	1.18767	2.435310	1.654753	.858283	.703874	.489342	-.121745	1.14970	.60883
1.930	1.28641	2.502190	1.689243	.863740	.723340	.483704	-.160506	1.14474	.62555
1.970	1.38786	2.570448	1.723618	.851761	.742549	.476472	-.201452	1.13893	.64261
2.010	1.49207	2.640067	1.757087	.817568	.761436	.467563	-.244277	1.13239	.66002
2.050	1.59908	2.710990	1.788657	.755920	.779931	.456911	-.288546	1.12520	.67775
2.090	1.70896	2.783118	1.817121	.661357	.797965	.444468	-.333683	1.11750	.69578
2.130	1.82175	2.856299	1.841056	.528606	.815465	.430215	-.378952	1.10939	.71407
2.170	1.93748	2.930320	1.858840	.353147	.832358	.414163	-.423454	1.10101	.73258
2.210	2.05618	3.004900	1.868700	.131955	.848574	.396363	-.466134	1.09249	.75122
2.230	2.11665	3.042292	1.870077	.003882	.856407	.386836	-.486422	1.08821	.76057
2.250	2.17787	3.079685	1.868779	-.135644	.864045	.376912	-.505801	1.08394	.76992
2.270	2.23984	3.117024	1.864578	-.286196	.871481	.366611	-.524108	1.07970	.77926
2.290	2.30255	3.154247	1.857262	-.447096	.878707	.355956	-.541178	1.07550	.78856
2.310	2.36601	3.191292	1.846632	-.617395	.885717	.344974	-.556848	1.07136	.79782
2.330	2.43020	3.228089	1.832512	-.795872	.892504	.333693	-.570960	1.06728	.80702
2.350	2.49513	3.264568	1.814753	-.981022	.899063	.322147	-.583360	1.06328	.81614
2.370	2.56078	3.300654	1.793239	-1.171075	.905388	.310371	-.593908	1.05937	.82516
2.390	2.62715	3.336272	1.767891	-1.364006	.911477	.298403	-.602476	1.05557	.83407
2.410	2.69423	3.371344	1.738674	-1.557577	.917324	.286286	-.608951	1.05188	.84284
2.430	2.76200	3.405793	1.705600	-1.749379	.922927	.274060	-.613243	1.04832	.85145
2.450	2.83046	3.439543	1.668728	-1.936880	.928286	.261771	-.615286	1.04488	.85989
2.470	2.89958	3.472518	1.628171	-2.117498	.933398	.249464	-.615036	1.04159	.86813
2.490	2.96935	3.504646	1.584091	-2.288668	.938264	.237185	-.612480	1.03843	.87616
2.510	3.03976	3.535860	1.536703	-2.447916	.942886	.224980	-.607633	1.03543	.88396
2.530	3.11078	3.566094	1.486269	-2.592939	.947264	.212894	-.600538	1.03257	.89152

TABLE III.-  $T_e/T_w = 0.25$ ,  $f_w = -1.0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
2.550	3.18240	3.595292	1.433094	-2.721670	.951403	.200973	-.591269	1.02986	.89882
2.570	3.25458	3.623402	1.377522	-2.832346	.955305	.189257	-.579925	1.02731	.90585
2.590	3.32732	3.650380	1.319930	-2.923562	.958975	.177789	-.566635	1.02491	.91259
2.610	3.40059	3.676188	1.260716	-2.994308	.962418	.166604	-.551547	1.02267	.91905
2.630	3.47436	3.700800	1.200397	-3.043995	.965641	.155738	-.534833	1.02057	.92520
2.650	3.54862	3.724195	1.139097	-3.072462	.968650	.145220	-.516679	1.01861	.93105
2.670	3.62332	3.746362	1.077538	-3.079968	.971452	.135079	-.497283	1.01680	.93659
2.690	3.69846	3.767297	1.016033	-3.067166	.974056	.125336	-.476853	1.01513	.94182
2.710	3.77401	3.787006	.954979	-3.035068	.976468	.116010	-.455599	1.01359	.94675
2.730	3.84993	3.805502	.894750	-2.984997	.978699	.107116	-.433730	1.01217	.95138
2.750	3.92622	3.822804	.835688	-2.918530	.980756	.098664	-.411453	1.01088	.95570
2.770	4.00284	3.838939	.776106	-2.837438	.982649	.090659	-.388964	1.00969	.95973
2.790	4.07977	3.853940	.722275	-2.743625	.984385	.083105	-.366450	1.00862	.96348
2.810	4.15699	3.867843	.668432	-2.639069	.985976	.076000	-.344084	1.00764	.96696
2.830	4.23448	3.880692	.616771	-2.525765	.987428	.069340	-.322025	1.00676	.97017
2.850	4.31221	3.892530	.567447	-2.405677	.988752	.063116	-.300412	1.00597	.97313
2.870	4.39017	3.903406	.520577	-2.280689	.989956	.057320	-.279370	1.00526	.97585
2.890	4.46834	3.913370	.476240	-2.152578	.991048	.051937	-.259003	1.00462	.97834
2.910	4.54670	3.922473	.434484	-2.022981	.992036	.046954	-.239400	1.00405	.98062
2.930	4.62523	3.930766	.395321	-1.893380	.992929	.042356	-.220630	1.00354	.98269
2.950	4.70393	3.938303	.358740	-1.765086	.993733	.038123	-.202748	1.00309	.98458
2.970	4.78276	3.945133	.324702	-1.639237	.994456	.034240	-.185791	1.00269	.98628
2.990	4.86173	3.951307	.293148	-1.516797	.995104	.030685	-.169785	1.00233	.98783
3.010	4.94081	3.956875	.264002	-1.398561	.995685	.027442	-.154740	1.00202	.98922
3.030	5.02000	3.961883	.237174	-1.285162	.996204	.024489	-.140656	1.00175	.99047
3.050	5.09928	3.966376	.212560	-1.177086	.996667	.021809	-.127524	1.00151	.99159
3.070	5.17865	3.970399	.190053	-1.074681	.997078	.019382	-.115325	1.00130	.99260
3.090	5.25809	3.973992	.169534	-.978174	.997443	.017190	-.104034	1.00112	.99350
3.110	5.33761	3.977193	.150886	-.887687	.997767	.015215	-.093619	1.00096	.99430
3.130	5.41718	3.980039	.133986	-.803244	.998053	.013440	-.084044	1.00082	.99501
3.150	5.49681	3.982563	.118716	-.724791	.998306	.011848	-.075269	1.00070	.99564
3.170	5.57648	3.984798	.104956	-.652213	.998528	.010424	-.067254	1.00060	.99620
3.190	5.65620	3.986771	.092590	-.585337	.998724	.009153	-.059955	1.00051	.99669
3.210	5.73595	3.988510	.081506	-.523948	.99896	.008021	-.053326	1.00043	.99713
3.230	5.81574	3.990039	.071597	-.467801	.999046	.007016	-.047324	1.00037	.99751
3.250	5.89555	3.991381	.062761	-.416626	.999177	.006124	-.041905	1.00031	.99785

TABLE III.-  $T_e/T_v = 0.25$ ,  $f_v = -1.0$ ,  $E_u = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/\rho u_e$
3.270	5.97539	3.992556	.054901	-.370139	.999291	.005336	-.037025	1.00026	.99814
3.290	6.05525	3.993583	.047926	-.328045	.999391	.004640	-.032642	1.00022	.99840
3.310	6.13513	3.994478	.041752	-.290048	.999478	.004027	-.028717	1.00018	.99862
3.350	6.29494	3.995934	.031495	-.225167	.999618	.003016	-.022084	1.00013	.99898
3.390	6.45480	3.997029	.023567	-.173210	.999722	.002242	-.016841	1.00009	.99926
3.430	6.61470	3.997844	.017495	-.132056	.999799	.001654	-.012736	1.00006	.99946
3.470	6.77463	3.998448	.012884	-.099797	.999856	.001211	-.009552	1.00004	.99961
3.510	6.93457	3.998890	.009414	-.074766	.999898	.000880	-.007106	1.00003	.99972
3.550	7.09454	3.999213	.006824	-.055533	.999928	.000635	-.005244	1.00002	.99980
3.590	7.25451	3.999446	.004908	-.040899	.999949	.000454	-.003838	1.00001	.99986
3.630	7.41449	3.999612	.003503	-.029869	.999965	.000323	-.002787	1.00001	.99990
3.670	7.57448	3.999731	.002481	-.021631	.999976	.000227	-.002007	1.00001	.99993
3.710	7.73447	3.999815	.001743	-.015537	.999983	.000159	-.001434	1.00000	.99995
3.750	7.89446	3.999873	.001215	-.011067	.999989	.000111	-.001017	1.00000	.99997
3.790	8.05446	3.999914	.000841	-.007818	.999992	.000076	-.000715	1.00000	.99998
3.830	8.21446	3.999942	.000577	-.005478	.999995	.000052	-.000499	1.00000	.99999
3.870	8.37445	3.999961	.000393	-.003807	.999997	.000035	-.000345	1.00000	.99999
3.910	8.53445	3.999974	.000265	-.002624	.999998	.000024	-.000237	1.00000	.99999
3.950	8.69445	3.999983	.000178	-.001794	.999999	.000016	-.000162	1.00000	1.00000
3.990	8.85445	3.999989	.000118	-.001217	.999999	.000011	-.000109	1.00000	1.00000
4.030	9.01445	3.999993	.000078	-.000818	1.000000	.000007	-.000073	1.00000	1.00000
4.070	9.17445	3.999996	.000051	-.000546	1.000000	.000005	-.000049	1.00000	1.00000
4.110	9.33445	3.999997	.000033	-.000361	1.000000	.000003	-.000032	1.00000	1.00000
4.150	9.49445	3.999998	.000021	-.000237	1.000000	.000002	-.000021	1.00000	1.00000
4.190	9.65445	3.999999	.000013	-.000154	1.000000	.000001	-.000014	1.00000	1.00000
4.230	9.81445	3.999999	.000008	-.000100	1.000000	.000001	-.000009	1.00000	1.00000
4.270	9.97445	4.000000	.000005	-.000064	1.000000	.000000	-.000006	1.00000	1.00000
4.350	10.29445	4.000000	.000002	-.000026	1.000000	.000000	-.000002	1.00000	1.00000
4.430	10.61445	4.000000	.000000	-.000010	1.000000	.000000	-.000001	1.00000	1.00000
4.510	10.93445	4.000000	-.000000	-.000004	1.000000	.000000	-.000000	1.00000	1.00000

TABLE IV.-  $T_e/T_w = 0.5$ ,  $f_w = 0$ ,  $Eu = 1/3$ 

$\gamma$	$f$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/\rho u_e$
.000	.00000	.000000	-0.093747	.000000	.404757	.069627	.00000	.00000
.005	.00001	.005241	-0.094046	.002025	.405106	.069815	.00524	.00262
.010	.00005	.010480	-0.094347	.004051	.405455	.069999	.01046	.00524
.015	.00012	.015717	-0.094649	.006079	.405806	.070179	.01567	.00786
.020	.00021	.020951	-0.094953	.008109	.406157	.070355	.02087	.01048
.025	.00033	.026183	-0.095259	.010141	.406509	.070527	.02605	.01309
.030	.00047	.031412	-0.095567	.012174	.406862	.070694	.03122	.01571
.040	.00084	.041864	-0.096188	.016246	.407571	.071016	.04152	.02093
.050	.00131	.052306	-0.096816	.020326	.408282	.071322	.05177	.02615
.060	.00188	.062739	-0.097451	.024412	.408997	.071609	.06197	.03137
.070	.00256	.073161	-0.098095	.028506	.409715	.071880	.07212	.03658
.080	.00335	.083574	-0.098746	.032606	.410435	.072133	.08221	.04179
.090	.00423	.093977	-0.099405	.036714	.411157	.072367	.09225	.04699
.100	.00632	.114753	-0.100750	.044952	.412609	.072782	.11217	.05738
.130	.00882	.135489	-0.102129	.053219	.414068	.073123	.13188	.06774
.150	.01174	.156184	-0.103545	.061515	.415533	.073388	.15138	.07809
.170	.01507	.176838	-0.105000	.069840	.417003	.073575	.17066	.08842
.190	.01881	.197449	-0.106495	.078195	.418476	.073683	.18973	.09872
.210	.02297	.218018	-0.108032	.086579	.419950	.073709	.20858	.10901
.250	.03251	.259026	-0.111242	.103436	.422895	.073508	.24563	.12951
.290	.04369	.299856	-0.114645	.120411	.425826	.072956	.28180	.14993
.330	.05650	.340502	-0.118258	.137502	.428727	.072037	.31709	.17025
.370	.07093	.380959	-0.122098	.154708	.431584	.070735	.35149	.19048
.410	.08697	.421220	-0.126185	.172028	.434380	.069030	.38499	.21061
.450	.10462	.461280	-0.130538	.189457	.437100	.066906	.41758	.23064
.530	.14471	.540765	-0.140124	.224634	.442242	.061330	.48003	.27038
.610	.19112	.619353	-0.151027	.260202	.446863	.053864	.53877	.30968
.690	.24378	.696973	-0.163428	.296114	.450806	.044375	.59378	.34849
.770	.30261	.773546	-0.177513	.332309	.453906	.032745	.64502	.38677
.850	.36752	.848983	-0.193466	.368712	.455906	.018877	.69247	.42449
.930	.43841	.923180	-0.211459	.405234	.456865	.002713	.73613	.46159
1.010	.51519	.996022	-0.231637	.441773	.456358	-.015761	.77601	.49801
1.090	.59774	1.067381	-0.254099	.478210	.454283	-.036494	.81217	.53369
1.170	.68593	1.137112	-0.278875	.514412	.450463	-.059355	.84464	.56856
1.250	.77963	1.205058	-0.305895	.550233	.444736	-.084122	.87353	.60253
1.330	.87868	1.271044	-0.334957	.585515	.436962	-.110462	.89894	.63552

TABLE IV.-  $T_e/T_w = 0.5$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho u_e$
1.410	.98294	1.334886	.783812	-.365691	.620089	.427032	-.137920	.92101	.66744
1.490	1.09220	1.396387	.753288	-.397530	.653781	.414880	-.165918	.93592	.69819
1.570	1.20629	1.455344	.720199	-.429683	.686410	.400490	-.193754	.95586	.72767
1.650	1.32499	1.511551	.684558	-.461131	.717800	.383906	-.220622	.96905	.75578
1.730	1.44806	1.564808	.646470	-.490646	.747780	.365240	-.245637	.97974	.78240
1.810	1.57527	1.614926	.606144	-.516844	.776188	.344678	-.267885	.98818	.80746
1.890	1.70636	1.661740	.563903	-.538273	.802885	.322476	-.286480	.99465	.83087
1.970	1.84106	1.705112	.520184	-.553537	.827750	.298960	-.300630	.99941	.85256
2.050	1.97908	1.744945	.475532	-.561434	.850694	.274510	-.309713	1.00274	.87247
2.130	2.12015	1.781190	.430573	-.561107	.871658	.249550	-.313334	1.00490	.89059
2.210	2.26398	1.813847	.385985	-.557715	.881390	.237018	-.313334	1.00490	.89059
2.290	2.41027	1.842975	.342454	-.534725	.907592	.199874	-.304016	1.00664	.92149
2.370	2.55876	1.868686	.300637	-.509476	.922621	.176014	-.298443	1.00669	.92812
2.450	2.70918	1.891139	.261116	-.477554	.935786	.153313	-.275170	1.00664	.93434
2.490	2.78503	1.901206	.242370	-.459547	.941701	.142496	-.265579	1.00629	.94015
2.530	2.86126	1.910538	.224367	-.440448	.947191	.132076	-.255267	1.00602	.94557
2.570	2.93786	1.919166	.207146	-.420474	.952272	.122082	-.244360	1.00572	.95060
2.610	3.01479	1.927121	.190738	-.399840	.956963	.112534	-.232984	1.00538	.95527
2.650	3.09202	1.934436	.175165	-.378759	.961281	.103448	-.221261	1.00503	.95958
2.730	3.24740	1.947282	.146571	-.336070	.968874	.086705	-.221261	1.00467	.96356
2.810	3.40353	1.957978	.121380	-.293896	.975205	.071888	-.197257	1.00395	.96722
2.890	3.56053	1.966792	.099501	-.253469	.980427	.058968	-.173235	1.00326	.97364
2.970	3.71817	1.973981	.080755	-.215722	.984688	.047861	-.149949	1.00264	.97899
3.050	3.87633	1.979789	.064900	-.181281	.988129	.038443	-.127993	1.00210	.98340
3.130	4.03491	1.984434	.051655	-.150496	.990880	.030563	-.107789	1.00165	.98699
3.210	4.19382	1.988115	.040722	-.123484	.993055	.024052	-.089601	1.00127	.98989
3.290	4.35298	1.991003	.031801	-.100179	.994760	.018739	-.073550	1.00096	.99222
3.370	4.51236	1.993248	.024602	-.080382	.996081	.014455	-.059643	1.00072	.99406
3.450	4.67189	1.994978	.018855	-.063806	.997095	.011041	-.047795	1.00053	.99550
3.530	4.83154	1.996297	.014316	-.050116	.997867	.008352	-.037860	1.00039	.99662
3.610	4.99129	1.997295	.010769	-.038954	.998448	.006256	-.029653	1.00028	.99749
							-.022969	1.00020	.99815
									.99865



TABLE IV.-  $T_e/T_W = 0.5$ ,  $f_W = 0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
3.690	5.15110	1.998042	.008025	.998881	.004642	-.017599	1.00014	.99902
3.770	5.31097	1.998596	.005925	.999201	.003411	-.013340	1.00010	.99930
3.850	5.47088	1.999004	.004334	.999435	.002482	-.010005	1.00007	.99950
3.930	5.63081	1.999300	.003140	.999604	.001790	-.007426	1.00005	.99965
4.010	5.79076	1.999514	.002254	.999726	.001278	-.005454	1.00003	.99976
4.090	5.95073	1.999667	.001603	.999817	.000904	-.003965	1.00002	.99983
4.170	6.11071	1.999776	.001129	.999875	.000633	-.002853	1.00001	.99989
4.250	6.27069	1.999852	.000788	.999916	.000439	-.002031	1.00001	.99993
4.330	6.43068	1.999904	.000545	.999945	.000302	-.001432	1.00001	.99995
4.410	6.59068	1.999941	.000374	.999965	.000206	-.000999	1.00001	.99997
4.490	6.75067	1.999966	.000254	.999979	.000139	-.000690	1.00000	.99998
4.570	6.91067	1.999982	.000171	.999988	.000093	-.000472	1.00000	.99999
4.650	7.07067	1.999994	.000115	.999994	.000061	-.000319	1.00000	1.00000
4.730	7.23067	2.000001	.000076	.999998	.000040	-.000214	1.00000	1.00000
4.810	7.39067	2.000006	.000051	1.000001	.000026	-.000142	1.00000	1.00000
4.890	7.55067	2.000010	.000034	1.000002	.000017	-.000093	1.00000	1.00000
4.970	7.71067	2.000012	.000022	1.000003	.000011	-.000061	1.00000	1.00001
5.050	7.87067	2.000013	.000015	1.000004	.000007	-.000039	1.00000	1.00001
5.130	8.03067	2.000014	.000010	1.000005	.000004	-.000025	1.00000	1.00001
5.210	8.19067	2.000015	.000007	1.000005	.000003	-.000016	1.00000	1.00001
5.290	8.35068	2.000016	.000006	1.000005	.000002	-.000010	1.00000	1.00001
5.450	8.67068	2.000016	.000004	1.000005	.000001	-.000004	1.00000	1.00001
5.610	8.99068	2.000017	.000003	1.000005	.000000	-.000001	1.00000	1.00001

TABLE V.-  $T_e/T_W = 0.5$ ,  $f_W = -0.5$ ,  $Eu = 1/3$

$\gamma_i$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
.000	-.50000	.000000	.867422	-.057654	.000000	.273157	.095448	.00000	.00000
.005	-.49999	.004336	.867133	-.057762	.001367	.273635	.095720	.00433	.00217
.010	-.49996	.008671	.866844	-.057871	.002736	.274115	.095990	.00866	.00434
.015	-.49990	.013005	.866554	-.057980	.004108	.274595	.096259	.01298	.00650
.020	-.49983	.017337	.866264	-.058090	.005482	.275077	.096526	.01729	.00867
.025	-.49973	.021667	.865973	-.058200	.006859	.275560	.096791	.02159	.01083
.030	-.49961	.025997	.865682	-.058311	.008238	.276045	.097055	.02589	.01300
.040	-.49931	.034051	.865098	-.058535	.011003	.277018	.097578	.03446	.01733
.050	-.49892	.043299	.864511	-.058761	.013778	.277997	.098094	.04300	.02165
.060	-.49844	.051941	.863923	-.058990	.016563	.278980	.098603	.05151	.02597
.070	-.49788	.060577	.863332	-.059222	.019358	.279969	.099106	.05999	.03029
.080	-.49723	.069207	.862738	-.059456	.022163	.280962	.099601	.06844	.03460
.090	-.49649	.077832	.862143	-.059693	.024977	.281961	.100089	.07686	.03892
.110	-.49477	.095063	.860944	-.060175	.030636	.283972	.101043	.09361	.04753
.130	-.49269	.112269	.859735	-.060669	.036336	.286002	.101966	.11023	.05613
.150	-.49027	.129452	.858517	-.061176	.042077	.288050	.102857	.12673	.06473
.170	-.48751	.146610	.857288	-.061697	.047858	.290116	.103715	.14310	.07331
.190	-.48441	.163743	.856049	-.062231	.053681	.292199	.104538	.15935	.08187
.210	-.48096	.180852	.854799	-.062780	.059546	.294298	.105325	.17547	.09043
.250	-.47305	.214993	.852265	-.063925	.071403	.298540	.106786	.20732	.10750
.290	-.46377	.249033	.849684	-.065138	.083430	.302838	.108085	.23864	.12452
.330	-.45313	.292967	.847053	-.066427	.095631	.307185	.109210	.26944	.14148
.370	-.44113	.316796	.844369	-.067798	.108006	.311573	.110147	.29969	.15840
.410	-.42778	.350516	.841628	-.069260	.120557	.315994	.110884	.32939	.17526
.450	-.41309	.384125	.838827	-.070821	.133286	.320440	.111406	.35853	.19206
.530	-.37968	.451001	.833026	-.074274	.159278	.329373	.111742	.41508	.22550
.610	-.34094	.517402	.826929	-.078237	.185985	.338291	.111030	.46929	.25870
.690	-.29691	.583301	.820492	-.082797	.213402	.347106	.109134	.52106	.29165
.770	-.24763	.648670	.813663	-.088054	.241516	.355717	.105914	.57034	.32434
.850	-.19314	.713475	.806382	-.094118	.270308	.364013	.101224	.61705	.35674
.930	-.13349	.777677	.798580	-.101108	.299747	.371870	.094919	.66112	.38884
1.010	-.06873	.841232	.790177	-.109157	.329792	.379153	.086857	.70252	.42062
1.090	.00109	.904087	.781083	-.118404	.360392	.385717	.076905	.74117	.45204
1.170	.07591	.966184	.771196	-.128994	.391483	.391405	.064947	.77706	.48309
1.250	.15566	1.027454	.760404	-.141072	.422989	.396053	.050891	.81015	.51373
1.330	.24027	1.097821	.748581	-.154779	.454819	.399490	.034682	.84044	.54391

TABLE V.-  $T_e/T_w = 0.5$ ,  $i_w = -0.5$ ,  $Eu = 1/3$  - Continued

$\eta$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
1.410	.32968	1.147196	.735592	.486870	.401544	.016308	.86793	.57360
1.490	.42380	1.205481	.721293	.519025	.402043	-.004180	.89264	.60274
1.570	.52253	1.262564	.705534	.551151	.400822	-.026659	.91463	.63128
1.650	.62577	1.318323	.688162	.583106	.397730	-.050919	.93396	.65916
1.730	.73342	1.372623	.669031	.614735	.392636	-.076650	.95072	.68631
1.810	.84535	1.425317	.648009	.645872	.385439	-.103435	.96503	.71266
1.890	.96142	1.476251	.624985	.676347	.376073	-.130744	.97702	.73813
1.970	1.08150	1.525260	.599889	.705985	.364523	-.157938	.98685	.76263
2.050	1.20541	1.572177	.572696	.734613	.350826	-.184284	.99471	.79609
2.130	1.33299	1.616836	.543451	.762063	.335082	-.208982	1.00077	.80842
2.210	1.46404	1.659077	.512271	.788176	.317455	-.231204	1.00525	.82954
2.290	1.59837	1.698754	.479365	.812812	.298177	-.250144	1.00837	.84938
2.370	1.73577	1.735738	.445029	.835849	.277539	-.265077	1.01033	.86787
2.450	1.87601	1.769931	.409647	.857192	.255886	-.275424	1.01135	.88497
2.530	2.01888	1.801266	.373680	.876774	.233603	-.280781	1.01161	.90063
2.610	2.16414	1.829718	.337640	.894563	.211096	-.281032	1.01132	.91486
2.690	2.31156	1.855302	.302070	.910555	.188771	-.276265	1.01062	.92765
2.770	2.46091	1.878077	.267506	.924781	.167016	-.266852	1.00967	.93904
2.850	2.61198	1.898144	.234446	.937302	.146181	-.253377	1.00858	.94907
2.930	2.76455	1.915640	.203322	.948203	.126562	-.236595	1.00743	.95782
3.010	2.91842	1.930736	.174479	.957591	.108390	-.217364	1.00631	.96537
3.090	3.07341	1.943624	.148160	.965588	.091825	-.196575	1.00525	.97181
3.170	3.22934	1.954513	.124503	.972328	.076957	-.175082	1.00430	.97726
3.250	3.38608	1.963616	.103547	.977947	.063811	-.153659	1.00346	.98191
3.330	3.54348	1.971150	.085243	.982582	.052354	-.132953	1.00274	.98558
3.410	3.70143	1.977322	.069470	.986366	.042507	-.113468	1.00214	.98866
3.490	3.85982	1.982328	.056055	.989423	.034158	-.095563	1.00165	.99116
3.570	4.01857	1.986348	.044787	.991867	.027170	-.079458	1.00125	.99317
3.650	4.17761	1.989544	.035437	.993802	.021395	-.065252	1.00094	.99477
3.730	4.33688	1.992062	.027768	.995319	.016680	-.052942	1.00069	.99603
3.810	4.49633	1.994026	.021551	.996495	.012877	-.042453	1.00051	.99701
3.890	4.65592	1.995543	.016566	.997399	.009843	-.033654	1.00037	.99777
3.970	4.81561	1.996704	.012613	.998087	.007452	-.026380	1.00026	.99835
4.050	4.97538	1.997584	.009512	.998606	.005587	-.020451	1.00018	.99879
4.130	5.13521	1.998244	.007105	.998992	.004149	-.015684	1.00013	.99912
4.210	5.29509	1.998736	.005257	.999279	.003051	-.011900	1.00009	.99937

TABLE V.-  $T_e/T_w = 0.5$ ,  $f_w = -0.5$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho u_e$
4.290	5.45501	1.999097	.003852	.999488	.002223	-.008933	1.00006	.99955
4.370	5.61495	1.999361	.002796	.999640	.001604	-.006637	1.00004	.99968
4.450	5.77490	1.999552	.002010	.999749	.001146	-.004879	1.00003	.99978
4.530	5.93487	1.999688	.001431	.999827	.000812	-.003550	1.00002	.99984
4.610	6.09485	1.999785	.001008	.999881	.000569	-.002557	1.00001	.99989
4.690	6.25484	1.999853	.000704	.999919	.000395	-.001823	1.00001	.99993
4.770	6.41483	1.999900	.000487	.999946	.000272	-.001286	1.00000	.99995
4.850	6.57482	1.999933	.000333	.999964	.000185	-.000898	1.00000	.99997
4.930	6.73482	1.999955	.000226	.999976	.000125	-.000621	1.00000	.99998
5.010	6.89482	1.999970	.000151	.999985	.000084	-.000425	1.00000	.99998
5.090	7.05481	1.999980	.000101	.999990	.000055	-.000288	1.00000	.99999
5.170	7.21481	1.999986	.000066	.999994	.000036	-.000193	1.00000	.99999
5.250	7.37481	1.999991	.000043	.999996	.000024	-.000128	1.00000	1.00000
5.330	7.53481	1.999993	.000027	.999998	.000015	-.000084	1.00000	1.00000
5.410	7.69481	1.999995	.000017	.999999	.000010	-.000055	1.00000	1.00000
5.490	7.85481	1.999996	.000011	.999999	.000006	-.000035	1.00000	1.00000
5.570	8.01481	1.999997	.000007	1.000000	.000004	-.000023	1.00000	1.00000
5.650	8.17481	1.999997	.000004	1.000000	.000002	-.000014	1.00000	1.00000
5.730	8.33481	1.999998	.000001	1.000000	.000001	-.000006	1.00000	1.00000
5.810	8.49481	1.999998	.000000	1.000000	.000000	-.000002	1.00000	1.00000
5.890	8.65481	1.999998	.000000	1.000000	.000000	-.000000	1.00000	1.00000

TABLE VI.-  $T_e/T_w = 0.5$ ,  $f_w = -1.0$ ,  $Eu = 1/3$

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$f_{u, \text{Re} \approx e}$
.000	-1.00000	.000000	.711247	-.031995	.000000	.167163	.083886	.00000	.00000
.005	-.99999	.003556	.711087	-.032030	.000837	.167613	.090186	.00355	.00178
.010	-.99996	.007111	.710926	-.032065	.001676	.168065	.090486	.00710	.00356
.015	-.99992	.010665	.710766	-.032100	.002518	.168518	.090786	.01065	.00533
.020	-.99986	.014219	.710605	-.032135	.003361	.168973	.091085	.01419	.00711
.025	-.99978	.017771	.710445	-.032170	.004207	.169429	.091385	.01773	.00889
.030	-.99968	.021323	.710284	-.032205	.005056	.169887	.091685	.02127	.01065
.040	-.99943	.028424	.709961	-.032276	.006759	.170807	.092284	.02833	.01421
.050	-.99911	.035522	.709638	-.032348	.008472	.171732	.092883	.03537	.01776
.060	-.99872	.042617	.709314	-.032419	.010194	.172664	.093481	.04240	.02131
.070	-.99826	.049708	.708990	-.032492	.011925	.173602	.094078	.04941	.02485
.080	-.99773	.056797	.708665	-.032565	.013666	.174546	.094675	.05641	.02840
.090	-.99712	.063882	.708339	-.032638	.015416	.175496	.095272	.06339	.03194
.110	-.99570	.078042	.707684	-.032786	.018945	.177413	.096461	.07730	.03902
.130	-.99400	.092189	.707027	-.032937	.022513	.179354	.097647	.09115	.04609
.150	-.99202	.106323	.706367	-.033090	.026119	.181319	.098829	.10493	.05316
.170	-.98975	.120444	.705703	-.033246	.029766	.183307	.100005	.11865	.06022
.190	-.98720	.134551	.705037	-.033405	.033452	.185319	.101175	.13230	.06728
.210	-.98437	.148645	.704367	-.033568	.037179	.187354	.102338	.14568	.07432
.250	-.97786	.176793	.703018	-.033903	.044755	.191494	.104642	.17284	.08840
.290	-.97022	.204886	.701655	-.034254	.052499	.195725	.106908	.19951	.10244
.330	-.96147	.232925	.700277	-.034622	.060414	.200046	.109131	.22589	.11646
.370	-.95159	.260908	.698885	-.035012	.068504	.204455	.111302	.25197	.13045
.410	-.94060	.288836	.697476	-.035424	.076772	.208949	.113414	.27775	.14442
.450	-.92848	.316706	.696050	-.035861	.085221	.213527	.115457	.30321	.15835
.530	-.90092	.372275	.693144	-.036826	.102677	.222930	.119302	.35316	.18614
.610	-.86893	.427607	.690155	-.037932	.120896	.232605	.122758	.40176	.21380
.690	-.83251	.482697	.687070	-.039211	.139901	.242548	.125734	.44893	.24135
.770	-.79170	.537535	.683875	-.040700	.159710	.252707	.128133	.49461	.26877
.850	-.74651	.592113	.680551	-.042440	.180338	.263031	.129848	.53872	.29606
.930	-.69697	.646420	.677077	-.044479	.201797	.273461	.130761	.58120	.32321
1.010	-.64310	.700441	.673425	-.046871	.224093	.283928	.130747	.62196	.35022
1.090	-.58491	.754162	.669566	-.049680	.247225	.294352	.129674	.66094	.37708
1.170	-.52244	.807565	.665464	-.052976	.271186	.304644	.127402	.69807	.40378
1.250	-.45571	.860629	.661075	-.056838	.295961	.314701	.123788	.73327	.43031
1.330	-.38475	.913328	.656352	-.061356	.321529	.324410	.118686	.76650	.45666

TABLE VI.-  $T_e/T_W = 0.5$ ,  $f_W = -1.0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
1.410	-30959	965635	651238	-066629	347854	333647	111954	.79768	.48282
1.490	-23026	1.017514	645668	-072766	374896	342276	103455	.82678	.50876
1.570	-14680	1.068927	639569	-079885	402598	350150	093062	.85375	.53446
1.650	-05924	1.119829	632857	-088113	430895	357113	080671	.87856	.55991
1.730	03236	1.170166	625438	-097579	459708	363002	066203	.90120	.58508
1.810	12797	1.219877	617208	-108414	488942	367649	049616	.92165	.60994
1.890	22752	1.268894	608052	-120741	518494	370884	030916	.93994	.63445
1.970	33097	1.317137	597846	-134667	548242	372541	010171	.95608	.65857
2.050	43824	1.364518	586460	-150267	578054	372461	-012480	.97014	.68226
2.130	54927	1.410936	573758	-167567	607785	370500	-036809	.98216	.70547
2.210	66396	1.456281	559605	-186526	637280	366535	-062498	.99225	.72814
2.290	78224	1.500431	543874	-207007	666375	360475	-089121	1.00051	.75022
2.370	90400	1.543255	526451	-228757	694899	352265	-116150	1.00705	.77163
2.450	1.02912	1.584615	507250	-251383	722680	341898	-142958	1.01203	.79231
2.530	1.15749	1.624366	486221	-274338	749546	329417	-168834	1.01560	.81218
2.610	1.28997	1.662362	463366	-296916	775333	314930	-193012	1.01792	.83118
2.690	1.4342	1.698458	438748	-318271	799886	298602	-214708	1.01917	.84923
2.770	1.58067	1.732518	412501	-337456	823067	280662	-233169	1.01953	.86626
2.850	1.73057	1.764420	384839	-353482	844757	261398	-247726	1.01917	.88221
2.930	1.88292	1.794063	356054	-365402	864864	241144	-257853	1.01825	.89703
3.010	1.98755	1.821369	326506	-372408	883324	220268	-263209	1.01694	.91068
3.090	2.13428	1.846295	296614	-373919	900101	199159	-263684	1.01537	.92315
3.170	2.28290	1.868831	266832	-369656	915194	178204	-259405	1.01366	.93442
3.250	2.43323	1.889004	237620	-359681	928628	157770	-250731	1.01191	.94450
3.330	2.58508	1.906877	209422	-344400	940460	138188	-238224	1.01021	.95344
3.410	2.73827	1.922549	182637	-324519	950769	119737	-222600	1.00860	.96127
3.490	2.89263	1.936146	157596	-300972	959654	102633	-204663	1.00713	.96807
3.570	3.04800	1.947818	134550	-274823	967230	087030	-185247	1.00582	.97391
3.650	3.20423	1.957732	113663	-247170	973621	073012	-165152	1.00469	.97887
3.730	3.36119	1.966063	095015	-219058	978954	060605	-145097	1.00372	.98303
3.810	3.51877	1.972993	078603	-191407	983359	049780	-125689	1.00291	.98650
3.890	3.67684	1.978697	064358	-164972	986959	040465	-107402	1.00225	.98935
3.970	3.83533	1.983345	052161	-140321	989871	032558	-090573	1.00172	.99167
4.050	3.99415	1.987093	041851	-117840	992202	025930	-075412	1.00129	.99355
4.130	4.15324	1.990086	032244	-097745	994050	020446	-062017	1.00096	.99504
4.210	4.31255	1.992452	026147	-080109	995500	015962	-050391	1.00071	.99623

TABLE VI.-  $T_e/T_w = 0.5$ ,  $r_w = -1.0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$i'$	$i''$	$i'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/peu_e$
4.290	4.47202	1.994304	.020363	.996627	.012339	-.040468	1.00052	.99715
4.370	4.63162	1.995740	.015704	.997493	.009445	-.032128	1.00037	.99787
4.450	4.79133	1.996842	.011993	.998154	.007160	-.025223	1.00026	.99842
4.530	4.95111	1.997680	.009071	.998652	.005376	-.019584	1.00019	.99884
4.610	5.11095	1.998310	.006794	.999025	.003998	-.015042	1.00013	.99916
4.690	5.27084	1.998781	.005039	.999301	.002944	-.011431	1.00009	.99939
4.770	5.43076	1.999128	.003701	.999503	.002148	-.008594	1.00006	.99956
4.850	5.59070	1.999382	.002692	.999650	.001552	-.006395	1.00004	.99969
4.930	5.75066	1.999565	.001939	.999755	.001111	-.004709	1.00003	.99978
5.010	5.91063	1.999697	.001383	.999831	.000788	-.003431	1.00002	.99985
5.090	6.07061	1.999791	.000977	.999884	.000553	-.002475	1.00001	.99990
5.170	6.23059	1.999857	.000684	.999921	.000385	-.001767	1.00001	.99993
5.250	6.39058	1.999903	.000473	.999947	.000265	-.001249	1.00000	.99995
5.330	6.55058	1.999934	.000325	.999964	.000181	-.000874	1.00000	.99997
5.410	6.71057	1.999956	.000220	.999976	.000122	-.000605	1.00000	.99998
5.490	6.87057	1.999970	.000148	.999985	.000082	-.000415	1.00000	.99999
5.570	7.03057	1.999980	.000099	.999990	.000054	-.000281	1.00000	.99999
5.650	7.19057	1.999986	.000065	.999993	.000036	-.000189	1.00000	.99999
5.730	7.35056	1.999991	.000042	.999996	.000023	-.000126	1.00000	1.00000
5.810	7.51056	1.999993	.000027	.999997	.000015	-.000083	1.00000	1.00000
5.890	7.67056	1.999995	.000017	.999998	.000010	-.000054	1.00000	1.00000
5.970	7.83056	1.999996	.000011	.999999	.000006	-.000035	1.00000	1.00000
6.050	7.99056	1.999997	.000007	.999999	.000004	-.000022	1.00000	1.00000
6.130	8.15056	1.999998	.000002	1.000000	.000001	-.000009	1.00000	1.00000
6.210	8.31056	1.999998	.000001	1.000000	.000001	-.000003	1.00000	1.00000
6.290	8.47056	1.999998	-.000000	1.000000	.000000	-.000001	1.00000	1.00000
6.370	8.63056	1.999998	-.000000	1.000000	.000000	-.000000	1.00000	1.00000
6.450	8.79056	1.999998	-.000000	1.000000	.000000	-.000000	1.00000	1.00000

TABLE VII.-  $T_e/T_W = 1.0$ ,  $f_W = 0$ ,  $E_u = 1/3$

$\gamma$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
.000	.00000	.757448	-.333333	.000000	.384156	-.000000	.00000	.00000
.005	.00001	.755781	-.333333	.001921	.384156	-.000002	.00378	.00378
.010	.00004	.754115	-.333333	.003842	.384156	-.000007	.00756	.00756
.015	.00009	.752448	-.333333	.005762	.384156	-.000015	.01132	.01132
.020	.00015	.750781	-.333333	.007683	.384156	-.000027	.01508	.01508
.025	.00024	.749115	-.333333	.009604	.384156	-.000042	.01883	.01883
.030	.00034	.747448	-.333333	.011525	.384155	-.000061	.02257	.02257
.040	.00060	.744115	-.333332	.015366	.384155	-.000108	.03003	.03003
.050	.00094	.740781	-.333330	.019206	.384153	-.000168	.03746	.03746
.060	.00135	.737448	-.333327	.023049	.384151	-.000242	.04485	.04485
.070	.00184	.734115	-.333324	.026891	.384148	-.000329	.05220	.05220
.080	.00240	.730782	-.333319	.030732	.384145	-.000429	.05953	.05953
.090	.00303	.727448	-.333313	.034574	.384140	-.000543	.06682	.06682
.110	.00451	.720782	-.333296	.042256	.384126	-.000808	.08130	.08130
.130	.00628	.714117	-.333273	.049939	.384107	-.001125	.09565	.09565
.150	.00833	.707451	-.333240	.057621	.384081	-.001494	.10987	.10987
.170	.01067	.700787	-.333198	.065302	.384047	-.001913	.12395	.12395
.190	.01329	.694124	-.333145	.072982	.384004	-.002382	.13790	.13790
.210	.01619	.687461	-.333080	.080662	.383951	-.002900	.15171	.15171
.250	.02280	.674141	-.332907	.096017	.383812	-.004084	.17895	.17895
.290	.03050	.660830	-.332672	.111366	.383622	-.005459	.20565	.20565
.330	.03925	.647529	-.332363	.126706	.383373	-.007022	.23181	.23181
.370	.04903	.634242	-.331973	.142035	.383058	-.008765	.25745	.25745
.410	.05984	.620972	-.331492	.157350	.382669	-.010685	.28255	.28255
.450	.07163	.607724	-.330912	.172648	.382201	-.012776	.30713	.30713
.530	.09812	.581307	-.329423	.203178	.380996	-.017445	.35469	.35469
.610	.12832	.555029	-.327445	.233596	.379393	-.022720	.40014	.40014
.690	.16208	.528930	-.324924	.263869	.377346	-.028542	.44350	.44350
.770	.19923	.503057	-.321814	.293959	.374814	-.034848	.48477	.48477
.850	.23959	.477457	-.318074	.323825	.371760	-.041566	.52399	.52399
.930	.28301	.452182	-.313676	.353426	.368154	-.048623	.56118	.56118
1.010	.32933	.427287	-.308600	.382715	.363973	-.055938	.59635	.59635
1.090	.37838	.402825	-.302834	.411646	.359199	-.063426	.62955	.62955
1.170	.43000	.378852	-.296379	.440171	.353823	-.071001	.66082	.66082
1.250	.48406	.355422	-.289245	.468241	.347839	-.078575	.69018	.69018
1.330	.54038	.332590	-.281453	.495809	.341253	-.086057	.71770	.71770



TABLE VII.-  $T_e/T_{\infty} = 1.0$ ,  $f_{\tau\tau} = 0$ ,  $Eu = 1/3$  - Continued

$\gamma$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/p_{e,u_e}$
1.410	.59884	.743416	.310406	-.273034	.522826	.334075	-.093360	.74342	.74542
1.490	.65928	.767384	.288920	-.264028	.549246	.326323	-.100398	.76738	.76738
1.570	.72158	.789663	.268176	-.254484	.575023	.318021	-.107089	.78966	.78966
1.650	.78559	.810313	.248216	-.244461	.600115	.309200	-.113355	.81031	.81031
1.730	.85119	.829399	.229074	-.234022	.624482	.299897	-.119125	.82940	.82940
1.810	.91825	.846988	.210781	-.223237	.648087	.290155	-.124336	.84699	.84699
1.890	.98667	.863148	.193363	-.212182	.670896	.280019	-.128933	.86315	.86315
1.970	1.05632	.877950	.176837	-.200933	.692881	.269543	-.132871	.87795	.87795
2.050	1.12710	.891466	.161217	-.189568	.714015	.258779	-.136113	.89147	.89147
2.130	1.19892	.903769	.146507	-.178168	.734279	.247784	-.138634	.90377	.90377
2.210	1.27168	.914931	.132709	-.166809	.753656	.236617	-.140420	.91493	.91493
2.290	1.34528	.925026	.119815	-.155565	.772135	.225336	-.141466	.92503	.92503
2.370	1.41965	.934125	.107813	-.144508	.789709	.214002	-.141777	.93413	.93413
2.450	1.49472	.942300	.096687	-.133703	.806375	.202671	-.141370	.94230	.94230
2.530	1.57040	.949618	.086413	-.123210	.822138	.191401	-.140269	.94962	.94962
2.610	1.64663	.956148	.076964	-.113081	.837003	.180246	-.138506	.95615	.95615
2.690	1.72336	.961953	.068309	-.103362	.850981	.169257	-.136122	.96195	.96195
2.770	1.80053	.967097	.060414	-.094092	.864089	.158481	-.133164	.96710	.96710
2.850	1.87808	.971639	.053241	-.085300	.876345	.147964	-.129682	.97164	.97164
2.930	1.95598	.975634	.046752	-.077010	.887772	.137745	-.125732	.97563	.97563
3.010	2.03417	.979136	.040906	-.069237	.898393	.127858	-.121373	.97914	.97914
3.090	2.11263	.982195	.035660	-.061989	.908239	.118334	-.116665	.98220	.98220
3.170	2.19131	.984857	.030974	-.055268	.917337	.109199	-.111669	.98486	.98486
3.250	2.27019	.987165	.026804	-.049068	.925721	.100474	-.106444	.98716	.98716
3.330	2.34925	.989158	.023109	-.043381	.933424	.092173	-.101051	.98916	.98916
3.410	2.42845	.990874	.019849	-.038192	.940481	.084308	-.095545	.99087	.99087
3.490	2.50778	.992345	.016986	-.033482	.946926	.076887	-.089981	.99234	.99234
3.570	2.58722	.993601	.014480	-.029228	.952794	.069912	-.084409	.99360	.99360
3.650	2.66675	.994670	.012298	-.025407	.958123	.063381	-.078876	.99467	.99467
3.730	2.74644	.995541	.008769	-.018956	.967301	.051630	-.068090	.99554	.99554
3.810	2.82604	.997525	.006158	-.013905	.974734	.041560	-.057904	.99752	.99752
3.890	2.90556	.998349	.004258	-.010028	.980684	.033058	-.048522	.99835	.99835
3.970	3.04523	.998916	.002898	-.007108	.985389	.025984	-.040076	.99892	.99892
4.050	3.18502	.999299	.001942	-.004953	.989066	.020182	-.032632	.99930	.99930
4.130	3.32478	.999554	.001281	-.003393	.991905	.015489	-.026200	.99955	.99955
4.210	3.46473	.999720	.000831	-.002284	.994072	.011746	-.020746	.99972	.99972

TABLE VII.-  $T_e/T_w = 1.0$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$p'u/peue$
4.930	3.94469	.999828	.000531	-.001511	.995706	.008802	-.016204	.99983	.99983
5.090	4.10467	.999896	.000334	-.000983	.996924	.006518	-.012485	.99990	.99990
5.250	4.26466	.999939	.000207	-.000628	.997821	.004769	-.009491	.99994	.99994
5.410	4.42465	.999965	.000126	-.000394	.998473	.003448	-.007119	.99996	.99996
5.570	4.58464	.999981	.000075	-.000243	.998942	.002463	-.005269	.99998	.99998
5.730	4.74464	.999990	.000045	-.000147	.999275	.001738	-.003849	.99999	.99999
5.890	4.90464	.999996	.000026	-.000088	.999509	.001212	-.002775	1.00000	1.00000
6.050	5.06464	.999999	.000015	-.000051	.999671	.000836	-.001975	1.00000	1.00000
6.210	5.22464	1.000001	.000009	-.000029	.999782	.000569	-.001387	1.00000	1.00000
6.370	5.38464	1.000002	.000005	-.000016	.999858	.000383	-.000962	1.00000	1.00000
6.530	5.54464	1.000003	.000003	-.000009	.999908	.000254	-.000658	1.00000	1.00000
6.690	5.70464	1.000003	.000002	-.000005	.999941	.000167	-.000445	1.00000	1.00000
6.850	5.86464	1.000003	.000001	-.000003	.999963	.000108	-.000297	1.00000	1.00000
7.010	6.02464	1.000003	.000001	-.000001	.999977	.000069	-.000195	1.00000	1.00000
7.170	6.18464	1.000004	.000001	-.000001	.999986	.000044	-.000127	1.00000	1.00000
7.330	6.34464	1.000004	.000001	-.000000	.999992	.000027	-.000081	1.00000	1.00000
7.490	6.50464	1.000004	.000001	-.000000	.999995	.000017	-.000052	1.00000	1.00000
7.650	6.66465	1.000004	.000001	-.000000	.999997	.000010	-.000032	1.00000	1.00000
7.810	6.82465	1.000004	.000001	-.000000	.999999	.000006	-.000020	1.00000	1.00000
7.970	6.98465	1.000004	.000001	-.000000	.000000	.000004	-.000012	1.00000	1.00000
8.130	7.14465	1.000004	.000001	-.000000	.000000	.000002	-.000007	1.00000	1.00000

TABLE VIII.-  $T_e/T_w = 1.0$ ,  $f_w = -0.5$ ,  $E_u = 1/3$

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
0.00	-0.50000	0.00000	0.574513	-0.141829	0.00000	0.241982	0.056462	0.00000	0.00000
0.05	-0.49999	0.002871	0.573803	-0.142066	0.01211	0.242264	0.056528	0.00287	0.00287
0.10	-0.49997	0.005738	0.573092	-0.142303	0.02423	0.242547	0.056591	0.00574	0.00574
0.15	-0.49994	0.008602	0.572380	-0.142540	0.03636	0.242830	0.056653	0.00860	0.00860
0.20	-0.49989	0.011462	0.571667	-0.142778	0.04851	0.243114	0.056714	0.01146	0.01146
0.25	-0.49982	0.014318	0.570952	-0.143016	0.06067	0.243398	0.056772	0.01432	0.01432
0.30	-0.49974	0.017171	0.570237	-0.143254	0.07285	0.243682	0.056830	0.01717	0.01717
0.40	-0.49954	0.022867	0.568802	-0.143732	0.09725	0.244250	0.056940	0.02287	0.02287
0.50	-0.49928	0.028547	0.567362	-0.144211	0.12170	0.244820	0.057043	0.02855	0.02855
0.60	-0.49897	0.034214	0.565918	-0.144692	0.14621	0.245391	0.057140	0.03421	0.03421
0.70	-0.49860	0.039866	0.564468	-0.145174	0.17078	0.245963	0.057231	0.03987	0.03987
0.80	-0.49817	0.045503	0.563014	-0.145657	0.19540	0.246536	0.057315	0.04550	0.04550
0.90	-0.49769	0.051126	0.561555	-0.146142	0.22008	0.247109	0.057393	0.05113	0.05113
1.10	-0.49656	0.062328	0.558623	-0.147114	0.26962	0.248259	0.057528	0.06233	0.06233
1.30	-0.49520	0.073471	0.555671	-0.148089	0.31939	0.249410	0.057637	0.07347	0.07347
1.50	-0.49362	0.084554	0.552699	-0.149069	0.36939	0.250564	0.057719	0.08455	0.08455
1.70	-0.49182	0.095579	0.549708	-0.150051	0.41961	0.251719	0.057773	0.09558	0.09558
1.90	-0.48979	0.106543	0.546697	-0.151037	0.47007	0.252875	0.057800	0.10654	0.10654
2.10	-0.48755	0.117446	0.543666	-0.152024	0.52076	0.254031	0.057798	0.11745	0.11745
2.50	-0.48242	0.139071	0.537546	-0.154003	0.62284	0.256341	0.057710	0.13907	0.13907
2.90	-0.47643	0.160449	0.531346	-0.155985	0.72584	0.258646	0.057506	0.16045	0.16045
3.30	-0.46959	0.181577	0.525067	-0.157965	0.82975	0.260940	0.057183	0.18158	0.18158
3.70	-0.46191	0.202453	0.518709	-0.159940	0.93459	0.263219	0.056739	0.20245	0.20245
4.10	-0.45340	0.223073	0.512272	-0.161904	1.04033	0.265478	0.056171	0.22307	0.22307
4.50	-0.44407	0.243434	0.505757	-0.163853	1.14696	0.267711	0.055478	0.24343	0.24343
5.30	-0.42299	0.283366	0.492494	-0.167688	1.36289	0.272082	0.053707	0.28337	0.28337
6.10	-0.39876	0.322225	0.478930	-0.171406	1.58225	0.276290	0.051414	0.32222	0.32222
6.90	-0.37146	0.359987	0.465074	-0.174965	1.80490	0.280294	0.048589	0.35999	0.35999
7.70	-0.34119	0.396629	0.450941	-0.178324	2.03066	0.284050	0.045227	0.39663	0.39663
8.50	-0.30803	0.432131	0.436548	-0.181441	2.25930	0.287516	0.041330	0.43213	0.43213
9.30	-0.27208	0.466471	0.421918	-0.184272	2.49059	0.290649	0.036904	0.46647	0.46647
1.010	-0.23343	0.499632	0.407074	-0.186775	2.72424	0.293407	0.031962	0.49963	0.49963
1.090	-0.19217	0.531598	0.392044	-0.188909	2.95993	0.295749	0.026523	0.53160	0.53160
1.170	-0.14840	0.562355	0.376859	-0.190634	3.19732	0.297638	0.020613	0.56235	0.56235
1.250	-0.10223	0.591892	0.361554	-0.191915	3.43602	0.299036	0.014266	0.59189	0.59189
1.330	-0.05373	0.620201	0.346165	-0.192716	3.67564	0.299910	0.007520	0.62020	0.62020

TABLE VIII.-  $T_p/T_w = 1.0$ ,  $f_w = -0.5$ ,  $R_0 = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$U$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
1.410	-0.00303	.647277	.330733	-.193010	.391373	.300230	.000424	.64728	.64728
1.490	.04980	.673118	.315298	-.192771	.415585	.299970	-.006971	.67312	.67312
1.570	.10464	.697726	.299904	-.191981	.439552	.299108	-.014606	.69773	.69773
1.650	.16140	.721105	.284596	-.190625	.463426	.297628	-.022417	.72111	.72111
1.730	.21998	.743265	.269419	-.188698	.487156	.295518	-.030338	.74326	.74326
1.810	.28029	.764217	.254420	-.186198	.510692	.292773	-.038295	.76422	.76422
1.890	.34223	.783978	.239643	-.183134	.533983	.289392	-.046218	.78398	.78398
1.970	.40570	.802567	.225133	-.179519	.556978	.285381	-.054030	.80257	.80257
2.050	.47061	.820008	.210934	-.175374	.579627	.280752	-.061658	.82001	.82001
2.130	.53687	.836326	.197087	-.170726	.601882	.275523	-.069029	.83633	.83633
2.210	.60439	.851552	.183630	-.165609	.623695	.269716	-.076073	.85155	.85155
2.290	.67309	.865718	.170600	-.160063	.645022	.263362	-.082724	.86572	.86572
2.370	.74288	.878860	.158030	-.154133	.665820	.256493	-.088920	.87886	.87886
2.450	.81368	.891016	.145948	-.147867	.686048	.249148	-.094606	.89102	.89102
2.530	.88541	.902226	.134379	-.141317	.705672	.241371	-.099733	.90223	.90223
2.610	.95801	.912531	.123343	-.134539	.724657	.233207	-.104260	.91253	.91253
2.690	1.03140	.921975	.112857	-.127588	.742976	.224706	-.108155	.92198	.92198
2.770	1.10551	.930603	.102933	-.120521	.760603	.215919	-.111393	.93060	.93060
2.850	1.18027	.938459	.093576	-.113395	.777517	.206901	-.113960	.93846	.93846
2.930	1.25564	.945590	.084790	-.106263	.793702	.197704	-.115848	.94559	.94559
3.010	1.33155	.952041	.076572	-.099179	.809146	.188383	-.117059	.95204	.95204
3.090	1.40795	.957857	.068918	-.092192	.823841	.178992	-.117605	.95786	.95786
3.170	1.48479	.963083	.061818	-.085348	.837784	.169583	-.117505	.96308	.96308
3.250	1.56203	.967762	.055258	-.078688	.850976	.160208	-.116783	.96776	.96776
3.330	1.63962	.971938	.049222	-.072249	.863420	.150914	-.115473	.97194	.97194
3.410	1.71753	.975651	.043691	-.066062	.875125	.141747	-.113612	.97565	.97565
3.490	1.79571	.978941	.038644	-.060154	.886104	.132749	-.111244	.97894	.97894
3.570	1.87415	.981846	.034059	-.054546	.896371	.123960	-.108416	.98185	.98185
3.650	1.95280	.984402	.029909	-.049254	.905944	.115414	-.105177	.98440	.98440
3.730	2.03164	.986643	.026169	-.044290	.914844	.107141	-.101581	.98664	.98664
3.810	2.11065	.988600	.022813	-.039658	.923095	.099169	-.097679	.98860	.98860
3.890	2.18981	.990302	.019815	-.035361	.930720	.091519	-.093525	.99030	.99030
3.970	2.26910	.991779	.017147	-.031397	.937747	.084210	-.089171	.99178	.99178
4.050	2.34849	.993054	.014783	-.027759	.944203	.077256	-.084670	.99305	.99305
4.210	2.50755	.995092	.010865	-.021426	.955519	.064447	-.075415	.99509	.99509
4.370	2.66689	.996579	.007865	-.016260	.964905	.053126	-.066118	.99658	.99658

TABLE VIII.-  $T_e/T_W = 1.0$ ,  $f_W = -0.5$ ,  $E_u = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$\rho u/\rho ue$
4.530	2.82643	.997648	.005607	-.012131	.972598	.043275	-.057080	.99765	.99765
4.690	2.98612	.998405	.003936	-.008898	.976828	.034834	-.048542	.99840	.99840
4.850	3.14591	.998932	.002720	-.006415	.983814	.027707	-.040677	.99893	.99893
5.010	3.30577	.999293	.001850	-.004547	.987757	.021777	-.033595	.99929	.99929
5.170	3.46568	.999538	.001238	-.003168	.990839	.016913	-.027354	.99954	.99954
5.330	3.62562	.999700	.000815	-.002170	.993219	.012980	-.021961	.99970	.99970
5.490	3.78558	.999806	.000528	-.001461	.995035	.009843	-.017388	.99981	.99981
5.650	3.94555	.999874	.000336	-.000966	.996404	.007375	-.013580	.99987	.99987
5.810	4.10554	.999917	.000209	-.000628	.997424	.005461	-.010462	.99992	.99992
5.970	4.26553	.999944	.000128	-.000402	.998175	.003995	-.007953	.99994	.99994
6.130	4.42552	.999960	.000076	-.000252	.998722	.002888	-.005965	.99996	.99996
6.290	4.58551	.999969	.000044	-.000155	.999115	.002063	-.004415	.99997	.99997
6.450	4.74551	.999975	.000024	-.000094	.999394	.001456	-.003225	.99997	.99997
6.610	4.90550	.999978	.000013	-.000056	.999590	.001016	-.002325	.99998	.99998
6.770	5.06550	.999979	.000006	-.000033	.999725	.000700	-.001654	.99998	.99998
6.930	5.22550	.999980	.000001	-.000019	.999819	.000476	-.001162	.99998	.99998
7.090	5.38549	.999980	-.000001	-.000011	.999882	.000320	-.000805	.99998	.99998
7.250	5.54549	.999979	-.000002	-.000006	.999924	.000213	-.000551	.99998	.99998
7.410	5.70549	.999979	-.000003	-.000003	.999952	.000140	-.000372	.99998	.99998
7.570	5.86548	.999978	-.000003	-.000002	.999970	.000091	-.000248	.99998	.99998
7.730	6.02548	.999978	-.000003	-.000001	.999982	.000058	-.000163	.99998	.99998
7.890	6.18548	.999977	-.000004	-.000000	.999989	.000037	-.000106	.99998	.99998
8.050	6.34547	.999977	-.000004	-.000000	.999994	.000023	-.000068	.99998	.99998
8.210	6.50547	.999976	-.000004	-.000000	.999997	.000014	-.000043	.99998	.99998
8.370	6.66547	.999976	-.000004	-.000000	.999999	.000009	-.000027	.99998	.99998
8.530	6.82546	.999975	-.000004	-.000000	1.000000	.000005	-.000017	.99998	.99998
8.690	6.98546	.999974	-.000004	-.000000	1.000000	.000003	-.000010	.99997	.99997
9.010	7.30545	.999973	-.000004	.000000	1.000001	.000001	-.000004	.99997	.99997

TABLE IX.-  $T_e/T_w = 1$ ,  $f_w = -1.0$ ,  $Eu = 1/3$ 

$\eta$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
0.00	1.00000	0.00000	-0.47520	0.00000	0.131417	0.061328	0.00000	0.00000
0.05	0.99999	0.002143	-0.47679	0.00058	0.131724	0.061471	0.00214	0.00214
0.10	0.99998	0.004285	-0.47838	0.001317	0.132032	0.061613	0.00428	0.00428
0.15	0.99995	0.006425	-0.47998	0.001978	0.132340	0.061756	0.00643	0.00643
0.20	0.99991	0.008565	-0.48158	0.002641	0.132649	0.061898	0.00856	0.00856
0.25	0.99987	0.010703	-0.48319	0.003305	0.132959	0.062039	0.01070	0.01070
0.30	0.99981	0.012840	-0.48480	0.003970	0.133270	0.062181	0.01284	0.01284
0.40	0.99966	0.017110	-0.48804	0.005306	0.133893	0.062462	0.01711	0.01711
0.50	0.99947	0.021376	-0.49130	0.006648	0.134519	0.062742	0.02138	0.02138
0.60	0.99923	0.025637	-0.49459	0.007996	0.135148	0.063020	0.02564	0.02564
0.70	0.99895	0.029892	-0.49789	0.009351	0.135779	0.063297	0.02989	0.02989
0.80	0.99863	0.034143	-0.50122	0.010712	0.136414	0.063573	0.03414	0.03414
0.90	0.99827	0.038388	-0.50457	0.012079	0.137051	0.063846	0.03839	0.03839
1.10	0.99742	0.046865	-0.51133	0.014833	0.138333	0.064389	0.04686	0.04686
1.30	0.99640	0.055320	-0.51817	0.017613	0.139626	0.064924	0.05532	0.05532
1.50	0.99520	0.063755	-0.52509	0.020418	0.140930	0.065452	0.06376	0.06376
1.70	0.99385	0.072169	-0.53210	0.023250	0.142244	0.065972	0.07217	0.07217
1.90	0.99232	0.080562	-0.53920	0.026108	0.143569	0.066484	0.08056	0.08056
2.10	0.99062	0.088933	-0.54637	0.028993	0.144904	0.066988	0.08893	0.08893
2.50	0.98673	0.105609	-0.55097	0.034843	0.147603	0.067967	0.10561	0.10561
2.90	0.98218	0.122196	-0.55758	0.040802	0.150340	0.068908	0.12220	0.12220
3.30	0.97696	0.138690	-0.55913	0.046871	0.153115	0.069807	0.13869	0.13869
3.70	0.97108	0.155090	-0.56069	0.053051	0.155924	0.070660	0.15509	0.15509
4.10	0.96455	0.171393	-0.56225	0.059345	0.158767	0.071465	0.17139	0.17139
4.50	0.95737	0.187596	-0.56387	0.065753	0.161641	0.072217	0.18760	0.18760
5.30	0.94108	0.219693	-0.56718	0.078917	0.167473	0.073549	0.21969	0.21969
6.10	0.92223	0.251360	-0.57061	0.092551	0.173402	0.074628	0.25136	0.25136
6.90	0.90087	0.282575	-0.57413	0.106663	0.179406	0.075423	0.28257	0.28257
7.70	0.87703	0.313315	-0.57773	0.121258	0.185461	0.075906	0.31332	0.31332
8.50	0.85075	0.343558	-0.58139	0.136338	0.191542	0.076046	0.34356	0.34356
9.30	0.82208	0.373280	-0.58511	0.151904	0.197619	0.075814	0.37328	0.37328
1.090	0.79577	0.403066	-0.58920	0.184488	0.209637	0.074126	0.40307	0.40307
1.250	0.68426	0.486482	-0.60011	0.218966	0.221244	0.070648	0.48648	0.48648
1.410	0.60216	0.539338	-0.60712	0.255248	0.232141	0.065233	0.53934	0.53934
1.570	0.51182	0.589452	-0.61368	0.293196	0.242011	0.057804	0.58945	0.58945
1.730	0.41369	0.636659	-0.61944	0.332619	0.250531	0.048367	0.63666	0.63666

TABLE IX.-  $T_e/T_w = 1$ ,  $f_w = -1.0$ ,  $E_u = 1/3$  - Continued

$\eta$	$\Gamma$	$\Gamma'$	$\Gamma''$	$\Gamma'''$	$\theta$	$\theta'$	$\theta''$	$u/\mu_e$	$p/\rho u_e$
1.890	-0.30825	.680809	.266127	-.124143	.373277	.257387	.037025	.68081	.68081
2.050	-0.19600	.721785	.245973	-.127535	.414878	.262290	.023991	.72178	.72178
2.210	-0.07746	.759499	.225396	-.129415	.457092	.264992	.009578	.75950	.75950
2.370	.04686	.793903	.204649	-.129633	.499548	.265304	-.005802	.79390	.79390
2.530	.17642	.824992	.184006	-.128104	.541855	.263110	-.021661	.82499	.82499
2.690	.31068	.852806	.163748	-.124823	.583608	.258376	-.037461	.85281	.85281
2.850	.44914	.877428	.144151	-.119870	.624403	.251156	-.052642	.87743	.87743
3.010	.59130	.898984	.125470	-.113403	.663853	.241592	-.066665	.89898	.89898
3.170	.73667	.917639	.107930	-.105652	.701600	.229911	-.079038	.91764	.91764
3.330	.88480	.933592	.091714	-.096901	.737329	.216409	-.089356	.93359	.93359
3.490	1.03528	.947066	.076958	-.087471	.770774	.201441	-.097323	.94707	.94707
3.650	1.18774	.958301	.063742	-.077693	.801734	.185399	-.102763	.95830	.95830
3.810	1.34183	.967547	.052098	-.067889	.830067	.168693	-.105633	.96755	.96755
3.970	1.49726	.975054	.042004	-.058351	.855702	.151728	-.106016	.97505	.97505
4.130	1.65377	.981067	.033399	-.049326	.878628	.134889	-.104102	.98107	.98107
4.290	1.81114	.985815	.026184	-.041004	.898892	.118521	-.100174	.98582	.98582
4.450	1.96918	.989512	.020234	-.033518	.916596	.102921	-.094579	.98951	.98951
4.610	2.12774	.992350	.015410	-.026940	.931881	.088324	-.087701	.99235	.99235
4.770	2.28669	.994495	.011565	-.021290	.944922	.074904	-.079932	.99450	.99450
4.930	2.44594	.996094	.008551	-.016541	.955918	.062773	-.071652	.99609	.99609
5.090	2.60542	.997268	.006227	-.012635	.965080	.051985	-.063206	.99727	.99727
5.250	2.76505	.998117	.004467	-.009489	.972624	.042541	-.054893	.99812	.99812
5.410	2.92480	.998721	.003156	-.007005	.978762	.034400	-.046953	.99872	.99872
5.570	3.08463	.999145	.002196	-.005084	.983697	.027487	-.039568	.99915	.99915
5.730	3.24452	.999438	.001504	-.003628	.987618	.021703	-.032861	.99944	.99944
5.890	3.40445	.999638	.001015	-.002544	.990696	.016933	-.026902	.99964	.99964
6.050	3.56440	.999771	.000674	-.001754	.993083	.013054	-.021714	.99977	.99977
6.210	3.72437	.999859	.000441	-.001189	.994914	.009945	-.017284	.99986	.99986
6.370	3.88436	.999917	.000284	-.000792	.996300	.007486	-.013570	.99992	.99992
6.530	4.04435	.999953	.000181	-.000518	.997338	.005568	-.010509	.99995	.99995
6.690	4.20434	.999976	.000113	-.000333	.998105	.004092	-.008029	.99998	.99998
6.850	4.36434	.999991	.000070	-.000211	.998666	.002972	-.006053	.99999	.99999
7.010	4.52434	1.000000	.000043	-.000131	.999072	.002133	-.004503	1.00000	1.00000
7.170	4.68434	1.000005	.000027	-.000080	.999361	.001512	-.003306	1.00001	1.00001
7.330	4.84434	1.000009	.000017	-.000048	.999564	.001059	-.002395	1.00001	1.00001
7.490	5.00434	1.000011	.000011	-.000023	.999707	.000733	-.001713	1.00001	1.00001

TABLE IX.-  $T_e/T_w = 1$ ,  $i_w = -1.0$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
7.650	5.16434	1.000012	.000007	-.000016	.999804	.000502	-.001209	1.00001	1.00001
7.810	5.32434	1.000013	.000005	-.000009	.999871	.000339	-.000842	1.00001	1.00001
7.970	5.48435	1.000014	.000004	-.000005	.999916	.000226	-.000579	1.00001	1.00001
8.130	5.64435	1.000015	.000003	-.000003	.999945	.000149	-.000393	1.00001	1.00001
8.290	5.80435	1.000015	.000003	-.000001	.999965	.000097	-.000264	1.00002	1.00002
8.450	5.96435	1.000016	.000003	-.000001	.999977	.000063	-.000174	1.00002	1.00002
8.610	6.12436	1.000016	.000003	-.000000	.999985	.000040	-.000114	1.00002	1.00002
8.770	6.28436	1.000016	.000003	-.000000	.999991	.000025	-.000073	1.00002	1.00002
8.930	6.44436	1.000017	.000003	-.000000	.999994	.000016	-.000047	1.00002	1.00002
9.090	6.60436	1.000017	.000003	-.000000	.999996	.000010	-.000029	1.00002	1.00002
9.250	6.76437	1.000018	.000003	-.000000	.999997	.000006	-.000018	1.00002	1.00002
9.410	6.92437	1.000018	.000003	-.000000	.999998	.000003	-.000011	1.00002	1.00002
9.570	7.08437	1.000019	.000003	-.000000	.999998	.000001	-.000004	1.00002	1.00002



TABLE X.--  $T_e/T_w = 2$ ,  $f_w = 0$ ,  $Eu = 1/3$

$\eta$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$p_3/p_{e3}$
.000	.00000	.000000	.589198	.000000	.372623	-.118021	.00000	.00000
.005	.00001	.002937	.585417	.001862	.372034	-.117431	.00294	.00587
.010	.00003	.005854	.581668	.003720	.371448	-.116848	.00588	.01171
.015	.00007	.008753	.577950	.005576	.370866	-.116273	.00880	.01751
.020	.00012	.011634	.574263	.007429	.370286	-.115705	.01172	.02327
.025	.00018	.014496	.570608	.009279	.369709	-.115145	.01463	.02899
.030	.00026	.017340	.566982	.011126	.369134	-.114591	.01753	.03468
.040	.00046	.022974	.559821	.014812	.367994	-.113505	.02331	.04595
.050	.00072	.028537	.552777	.018486	.366864	-.112446	.02906	.05707
.060	.00103	.034030	.545848	.022149	.365745	-.111414	.03478	.06806
.070	.00140	.039454	.539031	.025801	.364636	-.110407	.04047	.07891
.080	.00182	.044811	.532323	.029442	.363537	-.109426	.04613	.08962
.090	.00230	.050101	.525723	.033072	.362447	-.108468	.05176	.10020
.110	.00340	.060486	.512834	.040299	.360296	-.106625	.06292	.12097
.130	.00472	.070617	.500346	.047484	.358182	-.104871	.07397	.14123
.150	.00623	.080502	.488242	.054627	.356101	-.103203	.08490	.16100
.170	.00793	.090149	.476505	.061728	.354053	-.101616	.09571	.18030
.190	.00983	.099565	.465120	.068789	.352036	-.100106	.10641	.19913
.210	.01191	.108756	.454473	.075810	.350048	-.098669	.11700	.21751
.230	.01662	.126492	.432938	.089733	.346156	-.096001	.13784	.25294
.250	.02202	.143407	.412999	.103503	.342365	-.093584	.15825	.28681
.290	.02808	.159547	.394165	.117124	.338666	-.091395	.17823	.31909
.330	.03478	.174954	.376355	.130598	.335050	-.089412	.19780	.34991
.410	.04207	.189668	.359495	.143929	.331510	-.087617	.21697	.37934
.450	.04994	.203725	.343519	.157120	.328039	-.085991	.23573	.40745
.490	.05836	.217160	.328365	.170173	.324629	-.084520	.25412	.43432
.530	.06731	.230005	.313979	.183091	.321275	-.083189	.27212	.46001
.570	.07675	.242288	.300310	.195875	.317972	-.081985	.28975	.48458
.610	.08664	.254039	.287313	.208529	.314715	-.080897	.30701	.50808
.650	.09707	.265282	.274945	.221053	.311499	-.079914	.32392	.53056
.690	.10790	.276042	.263167	.233450	.308321	-.079026	.34048	.55208
.730	.11915	.286342	.251944	.245719	.305176	-.078226	.35726	.57268
.770	.13080	.296205	.241243	.257864	.302062	-.077503	.37258	.59241
.810	.14284	.305648	.231034	.269885	.298975	-.076852	.38814	.61130
.850	.16801	.323357	.211981	.293558	.292873	-.075737	.41828	.64671
.970	.19454	.339610	.194584	.316746	.286851	-.074833	.44718	.67922

TABLE X.-  $T_e/T_w = 2$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
1.050	.22231	.354530	.178671	-.190290	.339456	.280895	-.074099	.47488	.70906
1.130	.25123	.368232	.164091	-.174479	.361691	.274992	-.073501	.50142	.73646
1.210	.28120	.380817	.150713	-.160200	.383456	.269132	-.073009	.52684	.76163
1.290	.31213	.392376	.138423	-.147267	.404753	.263308	-.072599	.55119	.78475
1.370	.34395	.402991	.127119	-.135523	.425586	.257514	-.072249	.57450	.80598
1.450	.37659	.412739	.116711	-.124833	.445956	.251747	-.071940	.59680	.82548
1.530	.40997	.421687	.107120	-.115080	.465866	.246003	-.071658	.61814	.84337
1.610	.44404	.429898	.098276	-.106164	.485317	.240281	-.071388	.63853	.85980
1.690	.47874	.437429	.090114	-.097998	.504311	.234581	-.071120	.65803	.87486
1.770	.51401	.444339	.082578	-.090507	.522851	.228902	-.070844	.67665	.88867
1.850	.54981	.450657	.075617	-.083622	.540936	.223246	-.070551	.69443	.90131
1.930	.58610	.456444	.069184	-.077286	.558571	.217615	-.070235	.71140	.91289
2.010	.62283	.461739	.063238	-.071447	.575755	.212009	-.069891	.72759	.92348
2.090	.66097	.466576	.057740	-.066059	.592493	.206433	-.069512	.74302	.93315
2.170	.69767	.470989	.052657	-.061081	.608786	.200888	-.069097	.75772	.94198
2.250	.73531	.475011	.047957	-.056478	.624636	.195379	-.068641	.77172	.95002
2.330	.77346	.478672	.043612	-.052217	.640047	.189907	-.068143	.78504	.95734
2.410	.81189	.481998	.039594	-.048269	.655022	.184477	-.067601	.79772	.96400
2.570	.88949	.487744	.032450	-.041211	.683678	.173756	-.066381	.82121	.97549
2.730	.96792	.492438	.026355	-.035126	.710635	.163245	-.064978	.84238	.98488
2.890	1.04702	.496228	.021166	-.029868	.735929	.152972	-.063396	.86142	.99246
3.050	1.12667	.499252	.016759	-.025317	.759601	.142967	-.061642	.87848	.99850
3.210	1.20675	.501627	.013031	-.021374	.781694	.133255	-.059729	.89375	1.00325
3.370	1.28716	.503454	.009891	-.017957	.802259	.123862	-.057671	.90735	1.00691
3.530	1.36783	.504820	.007261	-.014995	.821348	.114807	-.055486	.91945	1.00964
3.690	1.44868	.505801	.005072	-.012430	.839017	.106112	-.053191	.93018	1.01160
3.850	1.52967	.506463	.003265	-.010212	.855324	.097791	-.050806	.93965	1.01293
4.010	1.61073	.506863	.001788	-.008297	.870351	.089658	-.048350	.94800	1.01373
4.170	1.69185	.507051	.000595	-.006650	.884100	.082322	-.045845	.95533	1.01410
4.330	1.77298	.507067	-.000353	-.005238	.896695	.075189	-.043308	.96175	1.01413
4.490	1.85410	.506949	-.001092	-.004033	.908182	.068464	-.040760	.96735	1.01390
4.650	1.93520	.506721	-.001654	-.003011	.918625	.062146	-.038218	.97222	1.01345
4.810	2.01625	.506428	-.002064	-.002149	.928090	.056233	-.035699	.97644	1.01286
4.970	2.09725	.506073	-.002349	-.001430	.936641	.050720	-.033220	.98008	1.01215
5.130	2.17819	.505682	-.002529	-.000834	.944342	.045600	-.030795	.98322	1.01136

TABLE X.-  $T_e/T_v = 2$ ,  $f_v = 0$ ,  $E_u = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$E_u/\rho_e u_e$
5.290	2.25907	.505269	-.002622	-.000348	.951253	.040862	-.028438	.98591	1.01054
5.450	2.33988	.504846	-.002645	.000042	.957437	.036495	-.026160	.98821	1.00969
5.610	2.42062	.504425	-.002613	.000350	.962951	.032486	-.023970	.99016	1.00885
5.770	2.50130	.504013	-.002537	.000587	.967851	.028820	-.021878	.99182	1.00803
5.930	2.58191	.503615	-.002428	.000762	.972191	.025480	-.019890	.99323	1.00723
6.250	2.74294	.502881	-.002147	.000965	.979390	.019711	-.016244	.99540	1.00576
6.570	2.90376	.502245	-.001825	.001022	.984922	.015035	-.013056	.99692	1.00449
6.890	3.06439	.501713	-.001502	.000984	.989113	.011307	-.010325	.99796	1.00343
7.210	3.22487	.501281	-.001202	.000889	.992243	.008381	-.008033	.99867	1.00256
7.530	3.38522	.500940	-.000937	.000766	.994547	.006123	-.006149	.99915	1.00188
7.850	3.54548	.500678	-.000713	.000634	.996219	.004408	-.004629	.99946	1.00136
8.170	3.70566	.500480	-.000531	.000509	.997414	.003126	-.003429	.99967	1.00096
8.490	3.86579	.500334	-.000387	.000396	.998256	.002185	-.002498	.99980	1.00067
8.810	4.02588	.500229	-.000276	.000300	.998841	.001504	-.001790	.99988	1.00046
9.130	4.18594	.500154	-.000193	.000222	.999240	.001020	-.001262	.99993	1.00031
9.450	4.34598	.500103	-.000133	.000160	.999509	.000681	-.000875	.99996	1.00021
9.770	4.50601	.500068	-.000089	.000113	.999688	.000448	-.000597	.99998	1.00014
10.090	4.66603	.500044	-.000059	.000074	.999804	.000290	-.000400	.99999	1.00009
10.410	4.82604	.500029	-.000038	.000053	.999879	.000185	-.000264	1.00000	1.00006
10.730	4.98604	.500019	-.000024	.000035	.999927	.000116	-.000171	1.00000	1.00004
11.050	5.14605	.500013	-.000015	.000023	.999957	.000072	-.000109	1.00000	1.00003
11.370	5.30605	.500009	-.000009	.000015	.999975	.000044	-.000069	1.00001	1.00002
11.690	5.46606	.500006	-.000006	.000009	.999986	.000026	-.000042	1.00001	1.00001
12.010	5.62606	.500005	-.000003	.000006	.999993	.000016	-.000026	1.00001	1.00001
12.330	5.78606	.500004	-.000002	.000003	.999996	.000009	-.000015	1.00001	1.00001
12.650	5.94606	.500004	-.000001	.000002	.999999	.000005	-.000009	1.00001	1.00001
12.970	6.10606	.500004	-.000000	.000001	1.000000	.000003	-.000005	1.00001	1.00001

TABLE XI.-  $T_e/T_w = 2$ ,  $f_w = -0.5$ ,  $Eu = 1/3$

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
.000	-.50000	.000000	.401790	-.268963	.000000	.217754	.010505	.000000	.000000
.005	-.49999	.002006	.400447	-.268158	.001089	.217807	.010505	.00201	.00401
.010	-.49998	.004004	.399108	-.267355	.002178	.217859	.010503	.00401	.00801
.015	-.49995	.005997	.397774	-.266556	.003267	.217912	.010501	.00602	.01199
.020	-.49992	.007982	.396443	-.265760	.004357	.217964	.010498	.00802	.01596
.025	-.49988	.009961	.395116	-.264967	.005447	.218017	.010493	.01002	.01992
.030	-.49982	.011933	.393793	-.264176	.006537	.218069	.010488	.01201	.02387
.040	-.49968	.015858	.391159	-.262605	.008719	.218174	.010474	.01600	.03172
.050	-.49950	.019757	.388541	-.261044	.010901	.218278	.010456	.01997	.03951
.060	-.49929	.023629	.385938	-.259496	.013084	.218383	.010435	.02394	.04726
.070	-.49903	.027475	.383351	-.257959	.015268	.218487	.010409	.02789	.05495
.080	-.49874	.031296	.380779	-.256432	.017454	.218591	.010384	.03184	.06259
.090	-.49840	.035091	.378222	-.254917	.019640	.218695	.010347	.03578	.07018
.110	-.49763	.042605	.373154	-.251918	.024016	.218901	.010270	.04363	.08521
.130	-.49670	.050018	.368145	-.248961	.028396	.219105	.010178	.05144	.10004
.150	-.49563	.057331	.363195	-.246045	.032780	.219308	.010072	.05921	.11466
.170	-.49441	.064546	.358303	-.243167	.037169	.219508	.009952	.06694	.12909
.190	-.49305	.071663	.353468	-.240328	.041561	.219706	.009818	.07464	.14333
.210	-.49154	.078685	.348690	-.237525	.045957	.219901	.009671	.08230	.15737
.250	-.48812	.092444	.339299	-.232026	.054761	.220281	.009339	.09751	.18489
.290	-.48415	.105852	.330126	-.226663	.063579	.220647	.008956	.11256	.21166
.330	-.47966	.118857	.321165	-.221429	.072412	.220997	.008527	.12746	.23771
.370	-.47465	.131528	.312410	-.216316	.081259	.221329	.008052	.14222	.26306
.410	-.46914	.143852	.303858	-.211320	.090118	.221641	.007534	.15682	.28770
.450	-.46314	.155839	.295503	-.206436	.098990	.221931	.006975	.17127	.31168
.530	-.44975	.178829	.279369	-.196982	.116765	.222441	.005744	.19971	.35766
.610	-.43457	.200558	.263975	-.187923	.134577	.222846	.004375	.22755	.40112
.690	-.41769	.221084	.249291	-.179232	.152418	.223137	.002883	.25478	.44217
.770	-.39922	.240463	.235289	-.170886	.170276	.223305	.001283	.28141	.48093
.850	-.37925	.258748	.221941	-.162868	.188143	.223340	-.000409	.30743	.51750
.930	-.35785	.275990	.209222	-.155161	.206007	.223237	-.002179	.33285	.55198
1.010	-.33512	.292239	.197107	-.147753	.223857	.222990	-.004015	.35766	.58448
1.170	-.28593	.321946	.174599	-.133789	.259468	.222044	-.007830	.40548	.64389
1.330	-.23228	.348225	.154238	-.120900	.294878	.220478	-.011758	.45091	.69645
1.490	-.17467	.371407	.135857	-.109025	.329987	.218280	-.015711	.49397	.74281
1.650	-.11357	.391797	.119299	-.098105	.364694	.215453	-.019612	.53468	.78359

TABLE XI.-  $T_e/T_v = 2$ ,  $f_v = -0.5$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/pe u_e$
1.810	-0.04943	0.09672	0.104415	-0.088088	0.398900	0.212011	-0.023393	0.57309	0.81934
1.970	0.01740	0.425291	0.091065	-0.078922	0.432506	0.207977	-0.026998	0.60923	0.85058
2.130	0.08656	0.438888	0.079117	-0.070553	0.465422	0.203384	-0.030377	0.64316	0.87778
2.290	0.15775	0.450677	0.068448	-0.062929	0.497561	0.198270	-0.033493	0.67492	0.90135
2.450	0.23069	0.460854	0.058943	-0.056000	0.528844	0.192681	-0.036316	0.70457	0.92171
2.610	0.30514	0.469595	0.050494	-0.049713	0.559197	0.186666	-0.038823	0.73219	0.93919
2.770	0.38089	0.477063	0.043003	-0.044019	0.588557	0.180276	-0.040999	0.75784	0.95413
2.930	0.45774	0.483402	0.036379	-0.038872	0.616868	0.173564	-0.042837	0.78160	0.96680
3.090	0.53553	0.488746	0.030537	-0.034226	0.644083	0.166586	-0.044333	0.80354	0.97749
3.250	0.61410	0.493212	0.025402	-0.030038	0.670164	0.159395	-0.045491	0.82375	0.98642
3.410	0.69331	0.496909	0.020903	-0.026269	0.695081	0.152046	-0.046318	0.84230	0.99382
3.570	0.77307	0.499932	0.016975	-0.022883	0.718813	0.144591	-0.046824	0.85929	0.99986
3.730	0.85326	0.502368	0.013562	-0.019844	0.741347	0.137079	-0.047023	0.87480	1.00474
3.890	0.93380	0.504296	0.010608	-0.017122	0.762678	0.129559	-0.046932	0.88891	1.00859
4.050	1.01461	0.505785	0.008067	-0.014688	0.782808	0.122075	-0.046569	0.90172	1.01157
4.210	1.09563	0.506897	0.005894	-0.012517	0.801746	0.114670	-0.045956	0.91330	1.01379
4.370	1.17680	0.507689	0.004049	-0.010584	0.819509	0.107382	-0.045112	0.92374	1.01538
4.530	1.25808	0.508208	0.002496	-0.008868	0.836116	0.100245	-0.044062	0.93313	1.01642
4.690	1.33942	0.508501	0.001201	-0.007349	0.851597	0.093292	-0.042827	0.94154	1.01700
4.850	1.42079	0.508605	0.000135	-0.006010	0.865981	0.086549	-0.041431	0.94905	1.01721
5.010	1.50216	0.508555	-0.000731	-0.004834	0.879305	0.080041	-0.039897	0.95573	1.01711
5.170	1.58352	0.508381	-0.001420	-0.003806	0.891608	0.073788	-0.038249	0.96166	1.01676
5.330	1.66484	0.508109	-0.001956	-0.002913	0.902932	0.067806	-0.036507	0.96690	1.01622
5.490	1.74611	0.507762	-0.002359	-0.002142	0.913321	0.062110	-0.034694	0.97151	1.01552
5.650	1.82732	0.507360	-0.002647	-0.001481	0.922822	0.056707	-0.032831	0.97556	1.01472
5.810	1.90846	0.506920	-0.002838	-0.000921	0.931483	0.051605	-0.030936	0.97911	1.01384
5.970	1.98953	0.506456	-0.002947	-0.000450	0.939352	0.046808	-0.029029	0.98220	1.01291
6.130	2.07053	0.505981	-0.002986	-0.000060	0.946478	0.042316	-0.027126	0.98488	1.01196
6.290	2.15145	0.505504	-0.002970	0.000259	0.952909	0.038127	-0.025243	0.98720	1.01101
6.450	2.23229	0.505033	-0.002907	0.000513	0.958694	0.034236	-0.023393	0.98921	1.01007
6.610	2.31306	0.504575	-0.002808	0.000711	0.963881	0.030638	-0.021590	0.99093	1.00915
6.770	2.39375	0.504136	-0.002682	0.000860	0.968514	0.027324	-0.019844	0.99240	1.00827
6.930	2.47438	0.503718	-0.002536	0.000965	0.972639	0.024285	-0.018163	0.99365	1.00744
7.090	2.55495	0.503298	-0.002206	0.001072	0.979535	0.018983	-0.015031	0.99562	1.00592
7.250	2.63545	0.502958	-0.001860	0.001074	0.984889	0.014630	-0.012234	0.99702	1.00462

TABLE XI.-  $T_e/T_w = 2$ ,  $f_w = -0.5$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
7.890	2.95694	.501766	-.001526	.001006	.988987	.011115	-.009795	.99801	1.00353
8.210	3.11743	.501328	-.001221	.000897	.992079	.008323	-.007713	.99868	1.00266
8.530	3.27780	.500981	-.000954	.000769	.994378	.006143	-.005974	.99915	1.00196
8.850	3.43806	.500713	-.000730	.000637	.996064	.004467	-.004550	.99945	1.00143
9.170	3.59826	.500510	-.000546	.000512	.997281	.003201	-.003409	.99966	1.00102
9.490	3.75840	.500359	-.000401	.000401	.998147	.002260	-.002512	.99979	1.00072
9.810	3.91849	.500250	-.000288	.000306	.998754	.001571	-.001820	.99988	1.00050
10.130	4.07856	.500172	-.000203	.000228	.999173	.001076	-.001298	.99993	1.00034
10.450	4.23861	.500118	-.000141	.000166	.999459	.000726	-.000910	.99996	1.00024
10.770	4.39864	.500080	-.000095	.000119	.999650	.000483	-.000627	.99999	1.00016
11.090	4.55866	.500055	-.000063	.000083	.999776	.000316	-.000426	1.00000	1.00011
11.410	4.71867	.500039	-.000041	.000057	.999858	.000204	-.000284	1.00001	1.00008
11.730	4.87868	.500028	-.000026	.000038	.999911	.000129	-.000186	1.00001	1.00006
12.050	5.03869	.500021	-.000016	.000025	.999944	.000081	-.000120	1.00001	1.00004
12.370	5.19870	.500017	-.000010	.000016	.999964	.000050	-.000076	1.00002	1.00003
12.690	5.35870	.500015	-.000006	.000010	.999977	.000030	-.000048	1.00002	1.00003
13.010	5.51871	.500013	-.000003	.000006	.999985	.000018	-.000029	1.00002	1.00003
13.330	5.67871	.500013	-.000001	.000004	.999989	.000011	-.000018	1.00002	1.00003
13.650	5.83872	.500012	-.000000	.000002	.999992	.000006	-.000010	1.00002	1.00002
13.970	5.99872	.500012	.000000	.000001	.999993	.000003	-.000006	1.00002	1.00002

TABLE XII.-  $T_e/T_W = 2$ ,  $f_W = -1.0$ ,  $E_u = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
.000	-1.000000	.000000	.262042	-.064013	.000000	.101823	.038705	.00000	.00000
.005	-1.000000	.001309	.261722	-.064128	.000510	.102017	.038750	.00131	.00262
.010	-.999999	.002617	.261401	-.064243	.001020	.102210	.038795	.00262	.00523
.015	-.999997	.003923	.261079	-.064357	.001532	.102405	.038839	.00393	.00785
.020	-.999995	.005228	.260757	-.064471	.002044	.102599	.038883	.00524	.01046
.025	-.999992	.006531	.260435	-.064585	.002558	.102793	.038927	.00655	.01306
.030	-.999988	.007832	.260111	-.064698	.003072	.102988	.038970	.00786	.01566
.040	-.999979	.010430	.259463	-.064925	.004104	.103378	.039056	.01047	.02086
.050	-.999967	.013022	.258813	-.065151	.005140	.103769	.039140	.01309	.02604
.060	-.999953	.015606	.258160	-.065375	.006179	.104161	.039223	.01570	.03121
.070	-.999936	.018185	.257505	-.065598	.007223	.104554	.039304	.01832	.03637
.080	-.999917	.020757	.256848	-.065821	.008270	.104947	.039384	.02093	.04151
.090	-.999895	.023322	.256189	-.066042	.009322	.105341	.039463	.02354	.04664
.110	-.999843	.028432	.254864	-.066481	.011437	.106132	.039615	.02876	.05686
.130	-.999781	.033516	.253530	-.066915	.013567	.106926	.039760	.03397	.06703
.150	-.999709	.038573	.252187	-.067344	.015714	.107723	.039900	.03918	.07715
.170	-.999627	.043604	.250836	-.067768	.017876	.108522	.040033	.04438	.08721
.190	-.999534	.048607	.249476	-.068186	.020055	.109324	.040160	.04958	.09721
.210	-.999432	.053583	.248109	-.068599	.022249	.110128	.040280	.05477	.10717
.250	-.999198	.063452	.245348	-.069407	.026687	.111744	.040500	.06515	.12690
.290	-.998925	.073210	.242556	-.070189	.031189	.113368	.040692	.07549	.14642
.330	-.998613	.082856	.239734	-.070944	.035756	.114999	.040856	.08582	.16571
.370	-.998262	.092388	.236881	-.071671	.040389	.116636	.040990	.09612	.18478
.410	-.997874	.101806	.234000	-.072368	.045087	.118278	.041095	.10640	.20361
.450	-.997448	.111108	.231092	-.073033	.049851	.119923	.041169	.11665	.22222
.530	-.996486	.129360	.225199	-.074263	.059577	.123220	.041223	.13707	.25872
.610	-.995379	.147138	.219214	-.075351	.069566	.126515	.041147	.15737	.29428
.690	-.994133	.164432	.213147	-.076288	.079819	.129800	.040939	.17756	.32886
.770	-.992750	.181239	.207012	-.077066	.090333	.133062	.040595	.19761	.36248
.850	-.991234	.197553	.200821	-.077678	.101108	.136291	.040114	.21753	.39511
.930	-.89590	.213370	.194588	-.078121	.112139	.139476	.039495	.23730	.42674
1.090	-.85933	.243501	.182050	-.078487	.134954	.145671	.037842	.27636	.48700
1.250	-.81809	.271625	.169509	-.078161	.158737	.151537	.035650	.31474	.54325
1.410	-.77251	.297750	.157075	-.077163	.183432	.157051	.032946	.35237	.59550
1.570	-.72291	.321901	.144851	-.075537	.208968	.162075	.029772	.38917	.64380
1.730	-.66961	.344119	.132933	-.073348	.235266	.166556	.026183	.42508	.68824

TABLE XII.-  $T_e/T_V = 2$ ,  $f_W = -1.0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
1.890	-0.61290	0.364460	0.121405	-0.070669	0.262234	0.170435	0.022241	0.46003	0.72892
2.050	-0.55308	0.382993	0.110340	-0.067587	0.289771	0.173659	0.018018	0.49397	0.76599
2.210	-0.49043	0.399797	0.099795	-0.064187	0.317768	0.176189	0.013587	0.52684	0.79959
2.370	-0.42523	0.414957	0.089813	-0.060556	0.346113	0.177999	0.009024	0.55858	0.82991
2.530	-0.35773	0.428568	0.080425	-0.056776	0.374689	0.179074	0.004403	0.58915	0.85714
2.690	-0.28816	0.440726	0.071648	-0.052921	0.403377	0.179409	-0.000204	0.61850	0.88145
2.850	-0.21677	0.451529	0.063491	-0.049056	0.432060	0.179012	-0.004733	0.64662	0.90306
3.010	-0.14374	0.461075	0.055948	-0.045236	0.460623	0.177902	-0.009125	0.67346	0.9215
3.170	-0.06928	0.469464	0.049010	-0.041506	0.488952	0.176103	-0.013326	0.69901	0.93893
3.330	0.00643	0.476790	0.042660	-0.037903	0.516941	0.173650	-0.017292	0.72326	0.95358
3.490	0.08324	0.483145	0.036873	-0.034454	0.544488	0.170583	-0.020988	0.74621	0.96629
3.650	0.16099	0.488618	0.031625	-0.031176	0.571498	0.166950	-0.024383	0.76786	0.97724
3.810	0.23955	0.493292	0.026887	-0.028084	0.597884	0.162798	-0.027456	0.78822	0.98658
3.970	0.31881	0.497247	0.022628	-0.025185	0.623568	0.158182	-0.030191	0.80732	0.99449
4.130	0.39864	0.500557	0.018818	-0.022479	0.648480	0.153155	-0.032580	0.82516	1.00111
4.290	0.47895	0.503291	0.015425	-0.019967	0.672559	0.147775	-0.034619	0.84178	1.00658
4.450	0.55966	0.505514	0.012418	-0.017645	0.695752	0.142096	-0.036311	0.85723	1.01103
4.610	0.64069	0.507284	0.009768	-0.015507	0.718017	0.136173	-0.037660	0.87152	1.01457
4.770	0.72197	0.508657	0.007446	-0.013545	0.739318	0.130062	-0.038678	0.88472	1.01731
4.930	0.80344	0.509683	0.005425	-0.011752	0.759629	0.123814	-0.039376	0.89685	1.01937
5.090	0.88506	0.510408	0.003677	-0.010119	0.778933	0.117478	-0.039771	0.90798	1.02082
5.250	0.96676	0.510873	0.002179	-0.008636	0.797220	0.111102	-0.039880	0.91815	1.02175
5.410	1.04852	0.511117	0.000906	-0.007296	0.814486	0.104731	-0.039723	0.92741	1.02223
5.570	1.13031	0.511174	-0.000163	-0.006089	0.830736	0.098404	-0.039320	0.93582	1.02235
5.730	1.21209	0.511075	-0.001049	-0.005006	0.845980	0.092160	-0.038694	0.94343	1.02215
5.890	1.29385	0.510847	-0.001771	-0.004040	0.860234	0.086032	-0.037868	0.95029	1.02169
6.050	1.37556	0.510516	-0.002348	-0.003182	0.873518	0.080052	-0.036862	0.95646	1.02103
6.210	1.45721	0.510103	-0.002795	-0.002425	0.885859	0.074245	-0.035701	0.96198	1.02021
6.370	1.53879	0.509627	-0.003129	-0.001761	0.897287	0.068635	-0.034407	0.96691	1.01925
6.530	1.62028	0.509107	-0.003363	-0.001183	0.907834	0.063240	-0.033002	0.97129	1.01821
6.690	1.70170	0.508556	-0.003511	-0.000685	0.917536	0.058079	-0.031507	0.97517	1.01711
6.850	1.78302	0.507987	-0.003586	-0.000259	0.926432	0.053162	-0.029943	0.97860	1.01597
7.010	1.86425	0.507411	-0.003598	0.000099	0.934562	0.048499	-0.028330	0.98162	1.01482
7.170	1.94539	0.506838	-0.003558	0.000397	0.941966	0.044098	-0.026685	0.98426	1.01368
7.330	2.02644	0.506275	-0.003474	0.000639	0.948687	0.039961	-0.025027	0.98657	1.01255
7.490	2.10740	0.505729	-0.003356	0.000832	0.954767	0.036089	-0.023370	0.98858	1.01146



TABLE XII.-  $T_e/T_w = 2$ ,  $f_w = -1.0$ ,  $E_1 = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
7.650	2.18828	.505203	-.003210	.000980	.960250	.032482	-.021730	.99032	1.01041
7.810	2.26907	.504702	-.003044	.001089	.965175	.029134	-.020119	.99183	1.00940
7.970	2.34978	.504230	-.002864	.001163	.969586	.026041	-.018549	.99312	1.00846
8.130	2.43042	.503786	-.002674	.001206	.973522	.023196	-.017029	.99423	1.00757
8.450	2.59150	.502993	-.002283	.001220	.980122	.018211	-.014173	.99599	1.00599
8.770	2.75235	.502324	-.001901	.001160	.985269	.014095	-.011599	.99725	1.00465
9.090	2.91300	.501774	-.001546	.001053	.989226	.010755	-.009335	.99814	1.00355
9.410	3.07350	.501331	-.001229	.000921	.992223	.008088	-.007388	.99876	1.00266
9.730	3.23387	.500982	-.000957	.000779	.994462	.005994	-.005751	.99919	1.00196
10.050	3.39414	.500714	-.000730	.000641	.996110	.004377	-.004402	.99948	1.00143
10.370	3.55433	.500511	-.000546	.000513	.997305	.003149	-.003313	.99967	1.00102
10.690	3.71447	.500360	-.000401	.000400	.998159	.002233	-.002453	.99980	1.00072
11.010	3.87456	.500251	-.000289	.000305	.998760	.001559	-.001786	.99988	1.00050
11.330	4.03463	.500173	-.000204	.000228	.999177	.001073	-.001279	.99993	1.00035
11.650	4.19468	.500118	-.000141	.000166	.999461	.000727	-.000901	.99997	1.00024
11.970	4.35471	.500080	-.000096	.000119	.999653	.000485	-.000624	.99999	1.00016
12.290	4.51473	.500055	-.000064	.000083	.999780	.000319	-.000425	1.00000	1.00011
12.610	4.67475	.500038	-.000042	.000057	.999863	.000206	-.000285	1.00001	1.00008
12.930	4.83476	.500027	-.000027	.000038	.999916	.000132	-.000188	1.00001	1.00005
13.250	4.99476	.500021	-.000017	.000025	.999950	.000083	-.000122	1.00002	1.00004
13.570	5.15477	.500016	-.000010	.000016	.999971	.000051	-.000078	1.00002	1.00003
13.890	5.31477	.500014	-.000006	.000010	.999984	.000031	-.000049	1.00002	1.00003
14.210	5.47478	.500012	-.000003	.000007	.999992	.000019	-.000030	1.00002	1.00002
14.530	5.63478	.500012	-.000002	.000004	.999997	.000011	-.000018	1.00002	1.00002
14.850	5.79479	.500011	-.000000	.000002	1.000000	.000006	-.000011	1.00002	1.00002
15.170	5.95479	.500011	.000000	.000001	1.000001	.000004	-.000006	1.00002	1.00002

TABLE XIII.-  $T_e/T_w = 4.0$ ,  $f_w = 0$ ,  $E_u = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho_e u_e$
.000	.00000	.000000	.487475	-1.532746	.000000	.367075	-.343597	.00000	.00000
.005	.00001	.002418	.479907	-1.494653	.001831	.365370	-.338553	.00243	.00967
.010	.00002	.004799	.472526	-1.457879	.003654	.363689	-.333635	.00485	.01920
.015	.00005	.007144	.465326	-1.422367	.005468	.362033	-.328838	.00726	.02858
.020	.00010	.009453	.458301	-1.388062	.007274	.360401	-.324158	.00966	.03781
.025	.00015	.011727	.451444	-1.354911	.009072	.358791	-.319592	.01205	.04691
.030	.00021	.013968	.444750	-1.322865	.010862	.357205	-.315134	.01442	.05587
.040	.00037	.018350	.431829	-1.261900	.014418	.354097	-.306534	.01914	.07340
.050	.00058	.022606	.419499	-1.204820	.017944	.351073	-.298329	.02382	.09042
.060	.00083	.026742	.407721	-1.151311	.021440	.348129	-.290496	.02846	.10697
.070	.00111	.030762	.396462	-1.101089	.024907	.345262	-.283011	.03306	.12305
.080	.00144	.034673	.385689	-1.053900	.028346	.342467	-.275853	.03762	.13869
.090	.00181	.038478	.375374	-1.009511	.031757	.339743	-.269003	.04214	.15391
.110	.00265	.045789	.356012	-.928308	.038499	.334494	-.256154	.05108	.18316
.130	.00364	.052728	.338183	-.856012	.045138	.329490	-.244335	.05987	.21091
.150	.00476	.059325	.321720	-.791400	.051680	.324714	-.233436	.06852	.23730
.170	.00601	.065605	.306482	-.733450	.058128	.320147	-.223358	.07705	.26242
.190	.00738	.071592	.292343	-.681301	.064487	.315775	-.214020	.08544	.28637
.210	.00887	.077306	.279196	-.634224	.070760	.311582	-.205348	.09372	.30922
.230	.01047	.082766	.266945	-.591600	.076951	.307557	-.197278	.10187	.33106
.250	.01218	.087989	.255506	-.552900	.083064	.303687	-.189753	.10991	.35196
.270	.01399	.092991	.244805	-.517669	.089100	.299963	-.182724	.11785	.37196
.290	.01590	.097786	.234778	-.485515	.095063	.296375	-.176147	.12567	.39114
.310	.01790	.102386	.225367	-.456101	.100956	.292915	-.169982	.13340	.40954
.330	.01999	.106804	.216518	-.429131	.106780	.289574	-.164195	.14102	.42722
.350	.02217	.111050	.208187	-.404349	.112539	.286345	-.158755	.14854	.44420
.370	.02443	.115135	.200331	-.381532	.118235	.283221	-.153633	.15597	.46054
.390	.02677	.119066	.192914	-.360482	.123869	.280197	-.148804	.16331	.47627
.410	.02919	.122854	.185901	-.341027	.129443	.277267	-.144245	.17056	.49142
.430	.03169	.126505	.179263	-.323013	.134960	.274426	-.139937	.17772	.50602
.450	.03425	.130027	.172972	-.306306	.140421	.271668	-.135860	.18480	.52011
.470	.03689	.133426	.167003	-.290786	.145827	.268990	-.131998	.19180	.53370
.490	.03959	.136709	.161333	-.276345	.151181	.266387	-.128336	.19871	.54684
.530	.04518	.142948	.150812	-.250332	.161736	.261392	-.121555	.21231	.57179
.570	.05102	.148787	.141263	-.227619	.172096	.256654	-.115421	.22560	.59515
.610	.05708	.154261	.132565	-.207685	.182271	.252150	-.109851	.23261	.61704

TABLE XIII.-  $T_e/T_w = h_0$ ,  $f_V = 0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/peu_e$
.650	.06336	.159402	-.190104	.192271	.247859	-.104776	.25135	.63761
.690	.06983	.164239	-.174530	.202103	.243762	-.100139	.26382	.65696
.730	.07649	.168796	-.160676	.211774	.239843	-.095888	.27604	.67519
.770	.08333	.173096	-.148304	.221292	.236087	-.091981	.28801	.69239
.810	.09034	.177159	-.137214	.230663	.232480	-.088381	.29975	.70864
.850	.09750	.181002	-.127241	.239892	.229013	-.085056	.31126	.72401
.890	.10481	.184641	-.118242	.248986	.225673	-.081977	.32256	.73856
.930	.11227	.188091	-.110099	.257948	.222451	-.079121	.33364	.75236
.970	.11986	.191365	-.102708	.266783	.219340	-.076465	.34452	.76546
1.010	.12757	.194474	-.095982	.275496	.216332	-.073992	.35520	.77790
1.050	.13541	.197430	-.089846	.284091	.213419	-.071684	.36569	.78972
1.090	.14337	.200241	-.084234	.292571	.210595	-.069526	.37600	.80097
1.130	.15143	.202918	-.079091	.300940	.207855	-.067505	.38612	.81167
1.170	.15960	.205469	-.074366	.309201	.205193	-.065609	.39606	.82187
1.210	.16787	.207900	-.070016	.317356	.202605	-.063829	.40583	.83160
1.250	.17628	.212433	-.062298	.333364	.197631	-.060576	.42488	.84973
1.370	.20185	.216566	-.055685	.348984	.192903	-.057681	.44330	.86626
1.450	.21932	.220343	-.049981	.364234	.188394	-.055092	.46111	.88137
1.530	.23709	.223799	-.045031	.379132	.184081	-.052764	.47835	.89520
1.610	.25512	.226967	-.040711	.393692	.179946	-.050662	.49503	.90787
1.690	.27340	.229874	-.036922	.407928	.175970	-.048756	.51119	.91950
1.770	.29190	.232544	-.033582	.421851	.172140	-.047021	.52684	.93018
1.850	.31060	.235000	-.030625	.435474	.168443	-.045434	.54201	.94000
1.930	.32949	.237259	-.027996	.448805	.164867	-.043978	.55671	.94904
2.010	.34856	.239339	-.025651	.461855	.161403	-.042637	.57096	.95735
2.090	.36778	.241254	-.023550	.474633	.158042	-.041398	.58478	.96502
2.170	.38715	.243019	-.021662	.487145	.154777	-.040250	.59817	.97207
2.250	.40666	.244645	-.019961	.499399	.151600	-.039181	.61117	.97858
2.330	.42629	.246143	-.018423	.511403	.148506	-.038184	.62378	.98457
2.410	.44604	.247523	-.017029	.523162	.145489	-.037251	.63601	.99009
2.490	.46589	.248794	-.015762	.534683	.142544	-.036376	.64787	.99518
2.650	.50589	.251040	-.013554	.557032	.136855	-.034773	.67055	1.00416
2.810	.54621	.252939	-.011705	.578490	.131408	-.033338	.69191	1.01176
2.970	.58681	.254538	-.010144	.599094	.126180	-.032038	.71201	1.01815
3.130	.62765	.255876	-.008817	.618878	.121150	-.030851	.73094	1.02351
3.290	.66868	.256989	-.007681	.637872	.116302	-.029756	.74877	1.02795

TABLE XIII.-  $T_e/T_w = 4.0$ ,  $f_w = 0$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
3.450	.70987	.257904	.005159	-.006704	.656104	.111624	-.028738	.76554	1.03162
3.610	.75120	.258648	.004156	-.005858	.673600	.107103	-.027785	.78132	1.03459
3.770	.79263	.259241	.003279	-.005123	.690384	.102730	-.026883	.79617	1.03696
3.930	.83415	.259703	.002511	-.004481	.706481	.098498	-.026027	.81013	1.03881
4.090	.87573	.260050	.001840	-.003918	.721911	.094399	-.025210	.82325	1.04020
4.250	.91736	.260296	.001254	-.003423	.736696	.090429	-.024425	.83557	1.04118
4.410	.95902	.260455	.000742	-.002987	.750855	.086582	-.023668	.84715	1.04182
4.570	1.00070	.260537	.000296	-.002600	.764408	.082854	-.022935	.85801	1.04215
4.730	1.04239	.260553	-.000092	-.002257	.777374	.079242	-.022223	.86819	1.04221
5.050	1.12575	.260418	-.000719	-.001681	.801618	.072351	-.020853	.88668	1.04167
5.370	1.20904	.260110	-.001181	-.001223	.823725	.065890	-.019541	.90289	1.04044
5.690	1.29221	.259676	-.001511	-.000857	.843831	.059840	-.018278	.91704	1.03870
6.010	1.37522	.259154	-.001737	-.000564	.862065	.054188	-.017058	.92938	1.03662
6.330	1.45806	.258574	-.001879	-.000330	.878552	.048919	-.015878	.94008	1.03429
6.650	1.54070	.257959	-.001953	-.000144	.893413	.044021	-.014737	.94935	1.03184
6.970	1.62315	.257329	-.001975	.000004	.906764	.039483	-.013634	.95734	1.02932
7.290	1.70540	.256700	-.001955	.000119	.918719	.035291	-.012572	.96420	1.02680
7.610	1.78744	.256082	-.001902	.000206	.929386	.031433	-.011551	.97008	1.02433
7.930	1.86929	.255485	-.001825	.000272	.938870	.027894	-.010573	.97509	1.02194
8.250	1.95095	.254916	-.001730	.000319	.947271	.024661	-.009639	.97934	1.01966
8.570	2.03244	.254379	-.001622	.000350	.954684	.021720	-.008753	.98293	1.01752
8.890	2.11376	.253878	-.001507	.000369	.961201	.019054	-.007915	.98596	1.01551
9.210	2.19493	.253415	-.001388	.000376	.966907	.016649	-.007126	.98850	1.01366
9.530	2.27595	.252991	-.001267	.000375	.971882	.014488	-.006387	.99062	1.01196
10.170	2.43762	.252255	-.001033	.000354	.979940	.010835	-.005063	.99384	1.00902
10.810	2.59887	.251664	-.000818	.000315	.985917	.007966	-.003938	.99602	1.00666
11.450	2.75978	.251202	-.000631	.000269	.990276	.005755	-.003004	.99748	1.00481
12.090	2.92043	.250850	-.000474	.000221	.993398	.004084	-.002247	.99843	1.00340
12.730	3.08088	.250589	-.000348	.000176	.995595	.002845	-.001647	.99905	1.00236
13.370	3.24120	.250400	-.000249	.000135	.997112	.001946	-.001183	.99943	1.00160
14.010	3.40141	.250266	-.000174	.000101	.998141	.001307	-.000835	.99967	1.00106
14.650	3.56155	.250174	-.000118	.000073	.998827	.000861	-.000574	.99981	1.00070
15.290	3.72164	.250111	-.000079	.000052	.999274	.000557	-.000387	.99990	1.00045
15.930	3.88169	.250070	-.000051	.000035	.999561	.000353	-.000256	.99995	1.00028
16.570	4.04173	.250044	-.000033	.000024	.999742	.000219	-.000166	.99998	1.00017
17.210	4.20175	.250027	-.000020	.000016	.999853	.000134	-.000105	1.00000	1.00011

TABLE XIII.-  $T_e/T_y = 4.0$ ,  $i_y = 0$ ,  $Eu = 1/3$  - Concluded

$\gamma$	$\xi$	$\xi'$	$\xi''$	$\xi'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/p_e u_e$
17.850	4.36177	.250017	-.000012	.000010	.999920	.000080	-.000065	1.000001	1.000007
18.490	4.52177	.250010	-.000007	.000006	.999960	.000047	-.000040	1.000001	1.000004
19.130	4.68178	.250007	-.000004	.000004	.999983	.000027	-.000024	1.000001	1.000003
19.770	4.84178	.250005	-.000002	.000002	.999997	.000015	-.000014	1.000002	1.000002
20.410	5.00179	.250004	-.000001	.000001	1.000004	.000008	-.000008	1.000002	1.000001

TABLE XIV.-  $T_e/T_V = 4.0$ ,  $f_V = -0.5$ ,  $E_u = 1/3$ 

$\gamma$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$\rho u/\rho u_e$
.000	-.50000	.000000	.296164	-.458506	.000000	.197544	-.053417	.00000	.00000
.005	-.50000	.001475	.293885	-.453220	.000987	.197278	-.053008	.00148	.00590
.010	-.49999	.002939	.291632	-.448019	.001973	.197014	-.052605	.00296	.01176
.015	-.49997	.004391	.289404	-.442902	.002957	.196752	-.052207	.00443	.01757
.020	-.49994	.005833	.287202	-.437868	.003940	.196492	-.051814	.00590	.02333
.025	-.49991	.007264	.285026	-.432914	.004922	.196234	-.051427	.00737	.02905
.030	-.49987	.008683	.282873	-.428039	.005903	.195978	-.051045	.00884	.03473
.040	-.49977	.011474	.278641	-.418819	.007860	.195471	-.050295	.01176	.04596
.050	-.49964	.014255	.274502	-.409295	.009812	.194972	-.049565	.01468	.05703
.060	-.49948	.016981	.270454	-.400356	.011759	.194480	-.048854	.01758	.06792
.070	-.49930	.019666	.266494	-.391690	.013702	.193994	-.048161	.02047	.07866
.080	-.49909	.022311	.262619	-.383286	.015639	.193516	-.047486	.02336	.08925
.090	-.49885	.024918	.258827	-.375134	.017572	.193045	-.046828	.02623	.09967
.110	-.49830	.030021	.251482	-.359549	.021424	.192121	-.045561	.03195	.12008
.130	-.49765	.034980	.244439	-.344860	.025257	.191222	-.044356	.03763	.13992
.150	-.49691	.039800	.237682	-.331002	.029073	.190346	-.043210	.04327	.15920
.170	-.49606	.044489	.231194	-.317916	.032871	.189493	-.042119	.04888	.17796
.190	-.49513	.049050	.224961	-.305544	.036653	.188661	-.041079	.05444	.19620
.210	-.49410	.053489	.218968	-.293839	.040418	.187850	-.040089	.05997	.21396
.230	-.49179	.062018	.207654	-.272245	.047900	.186283	-.038244	.07093	.24807
.250	-.48915	.070112	.197160	-.252811	.055321	.184788	-.036564	.08175	.28045
.330	-.48619	.077801	.187404	-.235262	.062684	.183356	-.035031	.09243	.31120
.370	-.48293	.085113	.178316	-.219368	.069991	.181984	-.033631	.10298	.34045
.410	-.47938	.092074	.169835	-.204930	.077243	.180664	-.032350	.11341	.36830
.450	-.47557	.098707	.161905	-.191780	.084444	.179394	-.031177	.12371	.39483
.490	-.47149	.105034	.154477	-.179772	.091595	.178169	-.030101	.13390	.42013
.530	-.46717	.111072	.147510	-.168779	.098698	.176985	-.029113	.14396	.44429
.570	-.46261	.116840	.140963	-.158693	.105755	.175839	-.028206	.15391	.46736
.610	-.45782	.122354	.134803	-.149420	.112766	.174727	-.027372	.16375	.48942
.650	-.45282	.127629	.129000	-.140874	.119733	.173648	-.026605	.17347	.51052
.690	-.44762	.132678	.123524	-.132985	.126658	.172598	-.025898	.18309	.53071
.730	-.44221	.137515	.118353	-.125688	.133542	.171575	-.025248	.19261	.55006
.770	-.43662	.142150	.113462	-.118926	.140385	.170578	-.024648	.20202	.56860
.810	-.43084	.146595	.108832	-.112649	.147188	.169603	-.024096	.21133	.58638
.850	-.41877	.154954	.100282	-.101380	.160680	.167716	-.023117	.22965	.61982
.970	-.40607	.162663	.092572	-.091582	.174025	.165900	-.022285	.24758	.65065

TABLE XIV.-  $T_e/T_w = 4.C$ ,  $f_w = -0.5$ ,  $Eu = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/peue$
1.050	-.39276	.169785	.085596	-.083013	.187226	.164147	-.021578	.25515	.67914
1.130	-.37891	.176375	.079262	-.075483	.200289	.162445	-.020978	.28235	.70550
1.210	-.36456	.182482	.073495	-.068834	.213218	.160738	-.020469	.29921	.72993
1.290	-.34973	.188148	.068229	-.062937	.226016	.159168	-.020039	.31572	.75259
1.370	-.33446	.193411	.063408	-.057686	.238686	.157580	-.019677	.33190	.77364
1.450	-.31879	.198304	.058984	-.052993	.251230	.156018	-.019374	.34776	.79322
1.530	-.30274	.202858	.054916	-.048784	.263650	.154479	-.019121	.36331	.81143
1.610	-.28634	.207099	.051167	-.044997	.275947	.152957	-.018912	.37854	.82840
1.690	-.26962	.211052	.047707	-.041579	.288123	.151452	-.018741	.39348	.84421
1.770	-.25258	.214739	.044506	-.038486	.300180	.149958	-.018602	.40812	.85896
1.850	-.23526	.218180	.041541	-.035680	.312117	.148474	-.018492	.42247	.87272
1.930	-.21768	.221392	.038790	-.033127	.323936	.146999	-.018405	.43654	.88557
2.010	-.19985	.224391	.036235	-.030799	.335637	.145529	-.018340	.45033	.89757
2.090	-.18178	.227194	.033857	-.028671	.347220	.144064	-.018292	.46385	.90878
2.170	-.16350	.229813	.031643	-.026723	.358687	.142602	-.018259	.47711	.91925
2.250	-.14534	.232459	.027649	-.023293	.3691270	.139683	-.018230	.50283	.93820
2.330	-.12634	.234549	.024161	-.020384	.403386	.136767	-.018235	.52754	.95475
2.410	-.10848	.236688	.021104	-.017902	.425035	.133847	-.018265	.55127	.96921
2.490	-.09499	.242303	.018414	-.015770	.446217	.130921	-.018307	.57405	.98184
2.570	-.08253	.248213	.016041	-.013930	.466929	.127988	-.018355	.59591	.99285
3.130	.06844	.250608	.013943	-.012335	.487172	.125048	-.018403	.61688	1.00243
3.290	.10871	.252688	.012083	-.010944	.506944	.122100	-.018446	.63698	1.01075
3.450	.14929	.254486	.010432	-.009727	.526244	.119145	-.018480	.65625	1.01794
3.610	.19013	.256036	.008963	-.008658	.545071	.116187	-.018501	.67471	1.02414
3.770	.23121	.257363	.007654	-.007715	.563424	.113226	-.018509	.69238	1.02945
3.930	.27248	.258493	.006488	-.006882	.581303	.110265	-.018501	.70928	1.03397
4.090	.31392	.259446	.005447	-.006142	.598708	.107306	-.018476	.72544	1.03778
4.250	.35549	.260242	.004518	-.005484	.615641	.104353	-.018433	.74089	1.04097
4.410	.39719	.260897	.003688	-.004897	.632102	.101409	-.018371	.75564	1.04359
4.570	.43897	.261427	.002948	-.004372	.648092	.098476	-.018290	.76971	1.04571
4.730	.48084	.261844	.002286	-.003901	.663615	.095557	-.018190	.78314	1.04738
5.050	.56472	.262391	.001171	-.003098	.693266	.089775	-.017934	.80811	1.04956
5.370	.64873	.262619	.000288	-.002445	.721081	.084087	-.017604	.83073	1.05047
5.690	.73277	.262595	.000406	-.001911	.747094	.078516	-.017205	.85114	1.05038
6.010	.81677	.262375	.000946	-.001472	.771346	.073082	-.016742	.86952	1.04950
6.330	.90068	.262004	.001357	-.001110	.793884	.067807	-.016220	.88601	1.04801

TABLE XIV.-  $T_e/T_W = 4.0$ ,  $f_W = -0.5$ ,  $Eu = 1/3$  - Concluded

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/p_{eue}$
6.650	.98444	.261518	-.001663	-.000810	.814761	.062707	-.015647	.90074	1.04607
6.970	1.06804	.260949	-.001881	-.000562	.834036	.057798	-.015029	.91387	1.04380
7.290	1.15144	.260322	-.002027	-.000357	.851773	.053092	-.014373	.92553	1.04129
7.610	1.23464	.259658	-.002113	-.000188	.868038	.048602	-.013686	.93584	1.03863
7.930	1.31762	.258975	-.002150	-.000049	.882902	.044336	-.012976	.94492	1.03590
8.250	1.40038	.258286	-.002148	.000063	.896438	.040299	-.012249	.95290	1.03315
8.570	1.48293	.257604	-.002112	.000154	.908719	.036497	-.011513	.95987	1.03042
8.890	1.56525	.256937	-.002051	.000225	.919821	.032932	-.010773	.96595	1.02775
9.210	1.64737	.256294	-.001970	.000280	.929820	.029602	-.010036	.97121	1.02517
9.530	1.72928	.255678	-.001873	.000321	.938792	.026508	-.009308	.97576	1.02271
9.850	1.81101	.255096	-.001766	.000350	.946810	.023644	-.008593	.97968	1.02038
10.170	1.89255	.254549	-.001651	.000368	.953948	.021006	-.007897	.98303	1.01820
10.490	1.97392	.254040	-.001531	.000377	.960277	.018588	-.007223	.98589	1.01616
10.810	2.05514	.253569	-.001410	.000379	.965867	.016381	-.006577	.98831	1.01428
11.130	2.13621	.253138	-.001290	.000374	.970782	.014376	-.005959	.99036	1.01255
11.450	2.21715	.252744	-.001171	.000364	.975088	.012563	-.005374	.99209	1.01098
11.770	2.29797	.252387	-.001057	.000350	.978842	.010933	-.004823	.99353	1.00955
12.090	2.37868	.252067	-.000948	.000332	.982103	.009473	-.004307	.99473	1.00827
12.410	2.45933	.251766	-.000843	.000291	.984948	.007019	-.003855	.99656	1.00610
12.730	2.54006	.251483	-.000743	.000246	.987328	.005109	-.003407	.99779	1.00441
13.050	2.62077	.251210	-.000650	.000201	.989384	.003653	-.003016	.99860	1.00313
13.370	2.70146	.250943	-.000563	.000159	.991129	.002564	-.002644	.99913	1.00217
13.690	2.78213	.250683	-.000483	.000123	.992574	.001767	-.002304	.99947	1.00148
14.010	2.86278	.250427	-.000408	.000092	.993728	.001195	-.002048	.99968	1.00099
14.330	2.94341	.250171	-.000338	.000067	.994693	.000793	-.001820	.99982	1.00065
14.650	3.02401	.250013	-.000274	.000047	.995468	.000516	-.001604	.99989	1.00041
14.970	3.10458	.250065	-.000204	.000033	.995974	.000330	-.001455	.99994	1.00026
15.290	3.18511	.250040	-.000131	.000022	.996438	.000207	-.001304	.99997	1.00016
15.610	3.26561	.250024	-.000059	.000014	.996848	.000127	-.001154	.99998	1.00010
15.930	3.34608	.250014	-.000012	.000009	.997212	.000076	-.001006	.99999	1.00006
16.250	3.42651	.250008	-.000007	.000006	.997530	.000045	-.000858	1.00000	1.00003
16.570	3.50693	.250005	-.000004	.000004	.997803	.000026	-.000708	1.00000	1.00002
16.890	3.58734	.250003	-.000002	.000002	.998035	.000015	-.000558	1.00000	1.00001
17.210	3.66774	.250001	-.000001	.000001	.998228	.000008	-.000408	1.00000	1.00001
17.530	3.74813								
17.850	3.82851								
18.170	3.90889								
18.490	3.98926								
18.810	4.06962								
19.130	4.15000								
19.450	4.23037								
19.770	4.31073								
20.090	4.39109								
20.410	4.47145								
20.730	4.55181								
21.050	4.63217								
21.370	4.71253								
21.690	4.79289								
22.010	4.87325								



TABLE XV.-  $T_e/T_w = 4.0$ ,  $f_w = -1.0$ ,  $Eu = 1/3$ 

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/ue$	$pu/ceue$
.000	1.00000	.00000	.161451	-.075616	.000000	.076403	.020769	.00000	.00000
.005	1.00000	.00806	.161073	-.075535	.000382	.076507	.020767	.00081	.00323
.010	-.99999	.001611	.160696	-.075455	.000765	.076611	.020765	.00161	.00644
.015	-.99998	.002413	.160319	-.075374	.001148	.076714	.020763	.00242	.00965
.020	-.99997	.003214	.159942	-.075293	.001532	.076818	.020760	.00323	.01286
.025	-.99995	.004013	.159566	-.075211	.001917	.076922	.020757	.00404	.01605
.030	-.99993	.004810	.159190	-.075129	.002301	.077026	.020755	.00484	.01924
.040	-.99987	.006398	.158439	-.074964	.003073	.077233	.020748	.00646	.02559
.050	-.99980	.007978	.157691	-.074798	.003846	.077441	.020741	.00807	.03191
.060	-.99971	.009552	.156943	-.074630	.004622	.077648	.020733	.00968	.03821
.070	-.99961	.011117	.156198	-.074461	.005399	.077856	.020725	.01130	.04447
.080	-.99949	.012675	.155454	-.074290	.006179	.078063	.020716	.01291	.05070
.090	-.99936	.014226	.154712	-.074118	.006960	.078270	.020706	.01452	.05691
.110	-.99904	.017306	.153233	-.073770	.008530	.078684	.020684	.01775	.06922
.130	-.99866	.020356	.151767	-.073417	.010108	.079097	.020659	.02097	.08142
.150	-.99823	.023376	.150297	-.073059	.011694	.079510	.020631	.02420	.09351
.170	-.99773	.026368	.148839	-.072696	.013288	.079922	.020601	.02742	.10547
.190	-.99717	.029330	.147389	-.072327	.014891	.080334	.020567	.03064	.11732
.210	-.99656	.032263	.145946	-.071954	.016501	.080745	.020531	.03386	.12905
.250	-.99515	.038044	.143083	-.071194	.019748	.081565	.020451	.04030	.15217
.290	-.99351	.043710	.140251	-.070415	.023027	.082381	.020360	.04673	.17484
.330	-.99165	.049264	.137450	-.069620	.026338	.083193	.020258	.05316	.19706
.370	-.98957	.054707	.134681	-.068808	.029682	.084002	.020146	.05958	.21883
.410	-.98728	.060039	.131945	-.067982	.033058	.084805	.020024	.06599	.24016
.450	-.98477	.065263	.129243	-.067142	.036466	.085603	.019891	.07240	.26105
.530	-.97914	.075389	.123940	-.065423	.043378	.087183	.019596	.08520	.30156
.610	-.97272	.085097	.118776	-.063662	.050415	.088738	.019264	.09797	.34039
.690	-.96554	.094397	.113755	-.061865	.057575	.090264	.018896	.11070	.37759
.770	-.95763	.103302	.108879	-.060042	.064856	.091760	.018493	.12340	.41321
.850	-.94902	.111822	.104149	-.058201	.072256	.093222	.018059	.13606	.44729
.930	-.93975	.119969	.099567	-.056349	.079771	.094649	.017595	.14868	.47988
1.090	-.91931	.135195	.090848	-.052642	.095136	.097384	.016585	.17378	.54078
1.250	-.89656	.149072	.082719	-.048974	.110925	.099951	.015482	.19868	.59629
1.410	-.87168	.161696	.075172	-.045390	.127110	.102335	.014302	.22336	.64678
1.570	-.84488	.173157	.068188	-.041927	.143662	.104525	.013062	.24779	.69263
1.730	-.81633	.183545	.061747	-.038613	.160547	.106512	.011777	.27195	.73418

TABLE XV.-  $T_e/T_w = 4.0$ ,  $f_w = -1.0$ ,  $E_u = 1/3$  - Continued

$\eta$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/pe u_e$
1.890	-.78619	.192944	.055823	-.035468	.177735	.108292	.010462	.29582	.77177
2.050	-.75463	.201434	.050388	-.032505	.195189	.109859	.009130	.31939	.80574
2.210	-.72178	.209092	.045411	-.029730	.212478	.111213	.007793	.34263	.83637
2.370	-.68776	.215989	.040864	-.027147	.230766	.112353	.006461	.36552	.86395
2.530	-.65270	.222190	.036714	-.024753	.248820	.113281	.005144	.38805	.88876
2.690	-.61670	.227757	.032933	-.022543	.267005	.114000	.003850	.41019	.91103
2.850	-.57985	.232746	.029491	-.020511	.285289	.114515	.002585	.43195	.93099
3.010	-.54225	.237211	.026361	-.018646	.303639	.114830	.001356	.45329	.94884
3.170	-.50397	.241197	.023516	-.016940	.322024	.114951	.000166	.47421	.96479
3.330	-.46509	.244750	.020932	-.015381	.340414	.114885	-.000980	.49470	.97900
3.490	-.42567	.247908	.018586	-.013960	.358778	.114639	-.002080	.51474	.99163
3.650	-.38577	.250709	.016458	-.012666	.377089	.114222	-.003131	.53433	1.00284
3.810	-.34546	.253185	.014527	-.011488	.395320	.113640	-.004131	.55345	1.01274
3.970	-.30477	.255367	.012776	-.010418	.413446	.112903	-.005080	.57211	1.02147
4.130	-.26376	.257282	.011188	-.009445	.431441	.112018	-.005976	.59029	1.02913
4.290	-.22245	.258955	.009749	-.008560	.449284	.110993	-.006820	.60799	1.03582
4.450	-.18090	.260409	.008445	-.007757	.466952	.109838	-.007612	.62520	1.04164
4.610	-.13913	.261664	.007263	-.007027	.484425	.108560	-.008352	.64193	1.04666
4.770	-.09718	.262739	.006192	-.006364	.501685	.107168	-.009040	.65818	1.05096
4.930	-.05506	.263651	.005223	-.005760	.518714	.105670	-.009678	.67393	1.05460
5.090	.02954	.265046	.003553	-.004713	.532012	.102338	-.010805	.70397	1.06019
5.250	.11451	.265957	.002188	-.003844	.544206	.098775	-.011744	.73208	1.06383
5.410	.19971	.266474	.001077	-.003122	.554199	.094890	-.012504	.75828	1.06589
5.570	.28502	.266669	.000177	-.002520	.561519	.090790	-.013096	.78261	1.06668
5.730	.37035	.266606	-.000546	-.002016	.564913	.086526	-.013532	.80511	1.06643
5.890	.45563	.266336	-.001122	-.001594	.567287	.082145	-.013825	.82586	1.06534
6.050	.54079	.265902	-.001574	-.001240	.56852	.077692	-.013986	.84492	1.06361
6.210	.62579	.265340	-.001921	-.000941	.568996	.073207	-.014026	.86235	1.06136
6.370	.71060	.264682	-.002181	-.000690	.567705	.068727	-.013957	.87824	1.05873
6.530	.79518	.263952	-.002367	-.000477	.563986	.064285	-.013790	.89268	1.05581
6.690	.87952	.263174	-.002490	-.000298	.55855	.059911	-.013536	.90573	1.05269
6.850	.96361	.262364	-.002561	-.000148	.552338	.055630	-.013206	.91749	1.04946
7.010	1.04743	.261539	-.002588	-.000022	.544970	.051466	-.012809	.92805	1.04616
7.170	1.13099	.260712	-.002577	.000083	.5365291	.047439	-.012355	.93749	1.04285
7.330	1.21429	.259893	-.002537	.000167	.528047	.043564	-.011853	.94589	1.03957
7.490	1.29733	.259091	-.002471	.000239	.5193190	.039857	-.011313	.95335	1.03637

TABLE XV.-  $T_e/T_w = 4.0$ ,  $f_w = -1.0$ ,  $Eu = 1/3$  - Concluded

$\gamma$	$f$	$f'$	$f''$	$f'''$	$\theta$	$\theta'$	$\theta''$	$u/u_e$	$pu/peu_e$
10.370	1.38011	.258314	-.002385	.000295	.905374	.036327	-.010743	.95993	1.03326
10.690	1.46265	.257567	-.002283	.000339	.916459	.032983	-.010151	.96571	1.03027
11.010	1.54496	.256854	-.002169	.000372	.926504	.029832	-.009544	.97078	1.02742
11.330	1.62704	.256180	-.002046	.000395	.935572	.026876	-.008929	.97520	1.02472
11.650	1.70892	.255545	-.001917	.000410	.943726	.024117	-.008313	.97904	1.02218
11.970	1.79059	.254953	-.001785	.000417	.951028	.021555	-.007702	.98235	1.01981
12.290	1.87209	.254403	-.001651	.000417	.957542	.019187	-.007101	.98521	1.01761
12.610	1.95342	.253896	-.001518	.000412	.963328	.017009	-.006515	.98765	1.01558
12.930	2.03459	.253431	-.001388	.000402	.968447	.015015	-.005948	.98974	1.01372
13.250	2.11562	.253007	-.001261	.000389	.972957	.013199	-.005404	.99150	1.01203
13.570	2.19652	.252624	-.001139	.000372	.976913	.011554	-.004885	.99300	1.01049
13.890	2.27730	.252278	-.001023	.000352	.980368	.010070	-.004394	.99425	1.00911
14.210	2.35798	.251968	-.000914	.000331	.983374	.008738	-.003933	.99530	1.00787
14.530	2.43906	.251647	-.000717	.000285	.988219	.006494	-.003103	.99690	1.00579
14.850	2.51906	.251044	-.000550	.000238	.991790	.004740	-.002399	.99799	1.00418
15.170	2.59886	.250738	-.000412	.000193	.994374	.003398	-.001817	.99872	1.00295
15.490	2.67986	.250511	-.000302	.000152	.996210	.002391	-.001348	.99919	1.00204
15.810	2.76109	.250346	-.000217	.000116	.997492	.001652	-.000979	.99950	1.00136
16.130	2.84042	.250229	-.000152	.000087	.998369	.001120	-.000697	.99969	1.00092
16.450	2.91906	.250148	-.000104	.000063	.998959	.000745	-.000486	.99981	1.00059
16.770	3.00082	.250093	-.000070	.000045	.999348	.000486	-.000331	.99988	1.00037
17.090	3.08151	.250056	-.000046	.000031	.999600	.000311	-.000221	.99992	1.00022
17.410	3.16109	.250032	-.000030	.000021	.999760	.000196	-.000145	.99995	1.00013
17.730	3.24154	.250017	-.000019	.000014	.999860	.000121	-.000093	.99996	1.00007
18.050	3.32127	.250007	-.000012	.000009	.999921	.000073	-.000058	.99997	1.00003
18.370	3.40139	.250001	-.000007	.000006	.999957	.000043	-.000036	.99997	1.00000
18.690	3.48146	.249997	-.000004	.000003	.999978	.000025	-.000022	.99997	.99999
19.010	3.56151	.249995	-.000003	.000002	.999991	.000014	-.000013	.99997	.99998
19.330	3.64154	.249994	-.000002	.000001	.999998	.000008	-.000007	.99997	.99997
19.650	3.72156								
19.970	3.80151								
20.290	3.88154								
20.610	3.96154								
20.930	4.04155								
21.250	4.12155								
21.570	4.20156								
21.890	4.28156								
22.210	4.36156								
22.530	4.44156								
22.850	4.52156								
23.170	4.60156								
23.490	4.68156								
23.810	4.76156								
24.130	4.84156								
24.450	4.92156								

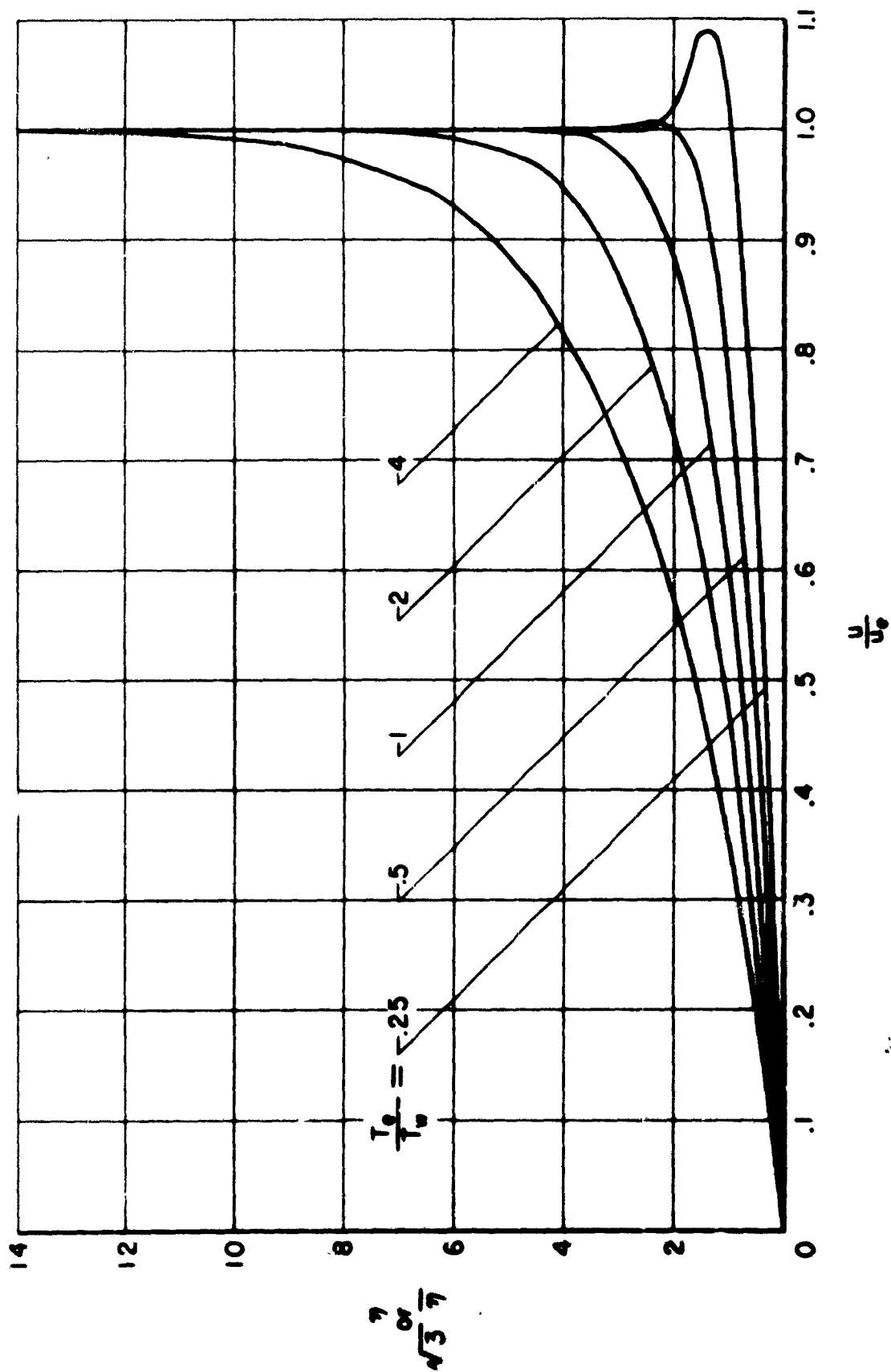


Figure 1.- Velocity profiles for  $f_w = 0$ .

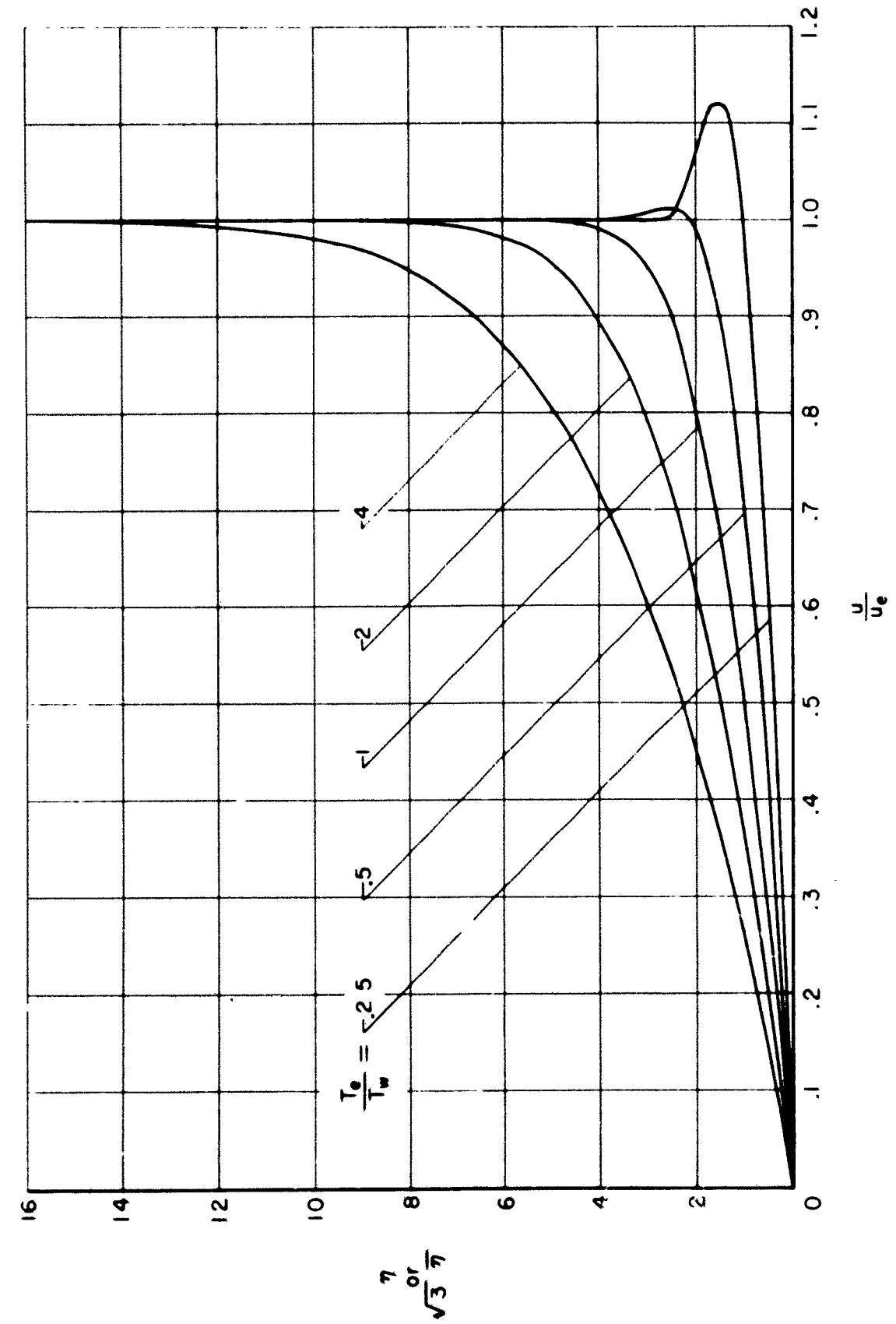


Figure 2.- Velocity profiles for  $\Gamma_w = -0.5$

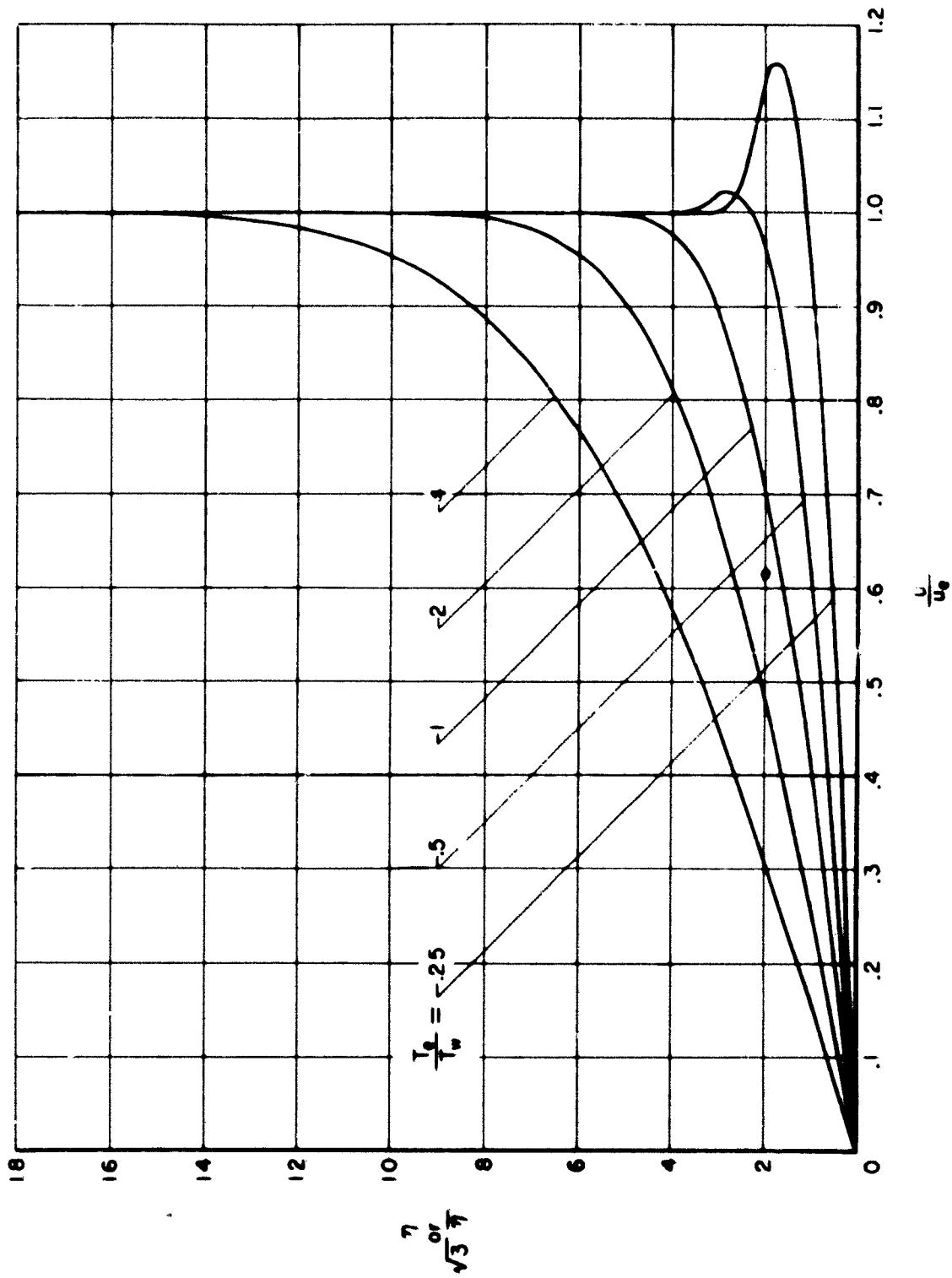


Figure 3.- Velocity profiles for  $f_w = -1.0$ .

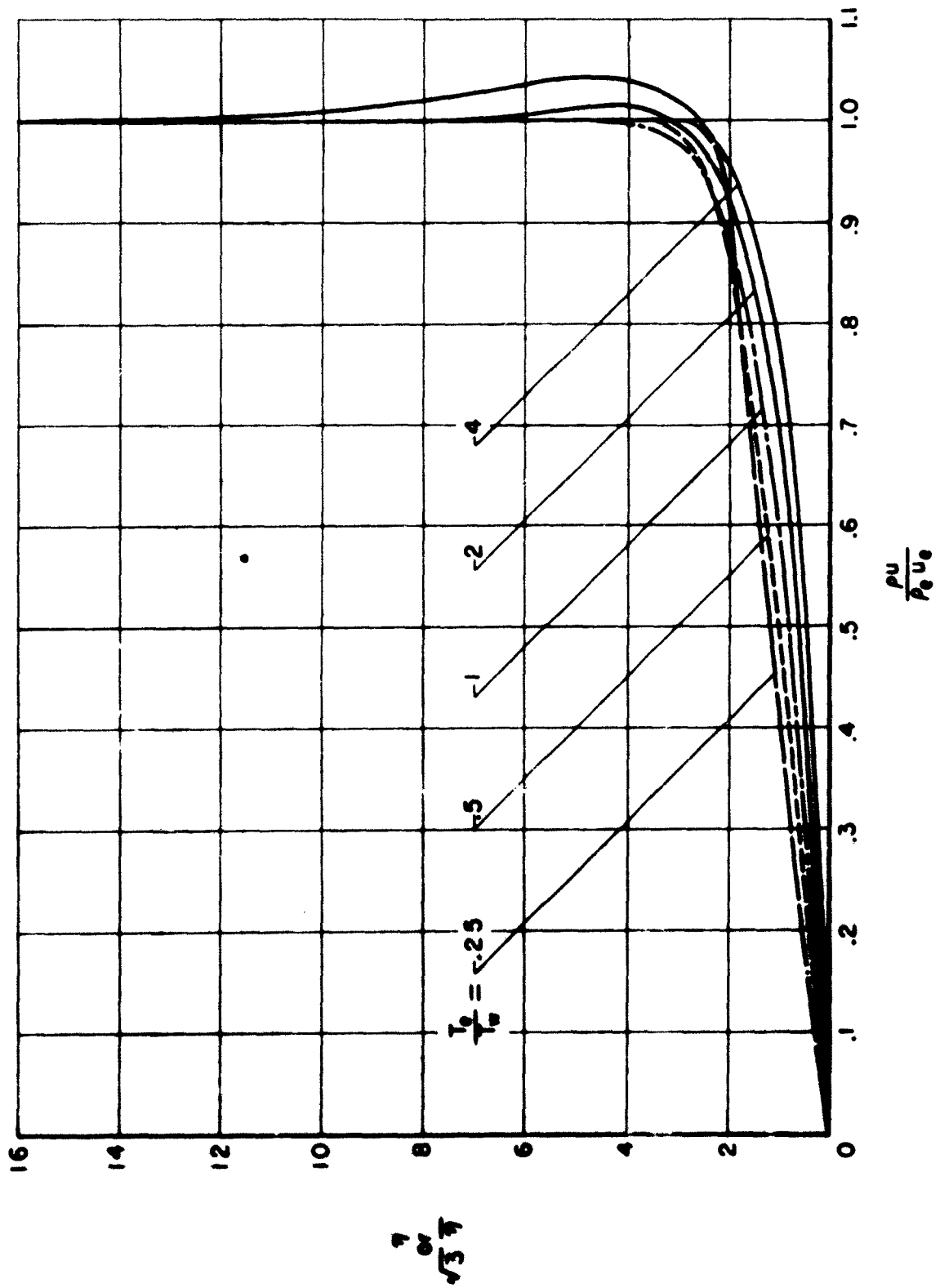


Figure 4.- Mass-flow profiles for  $f_W = 0$ .

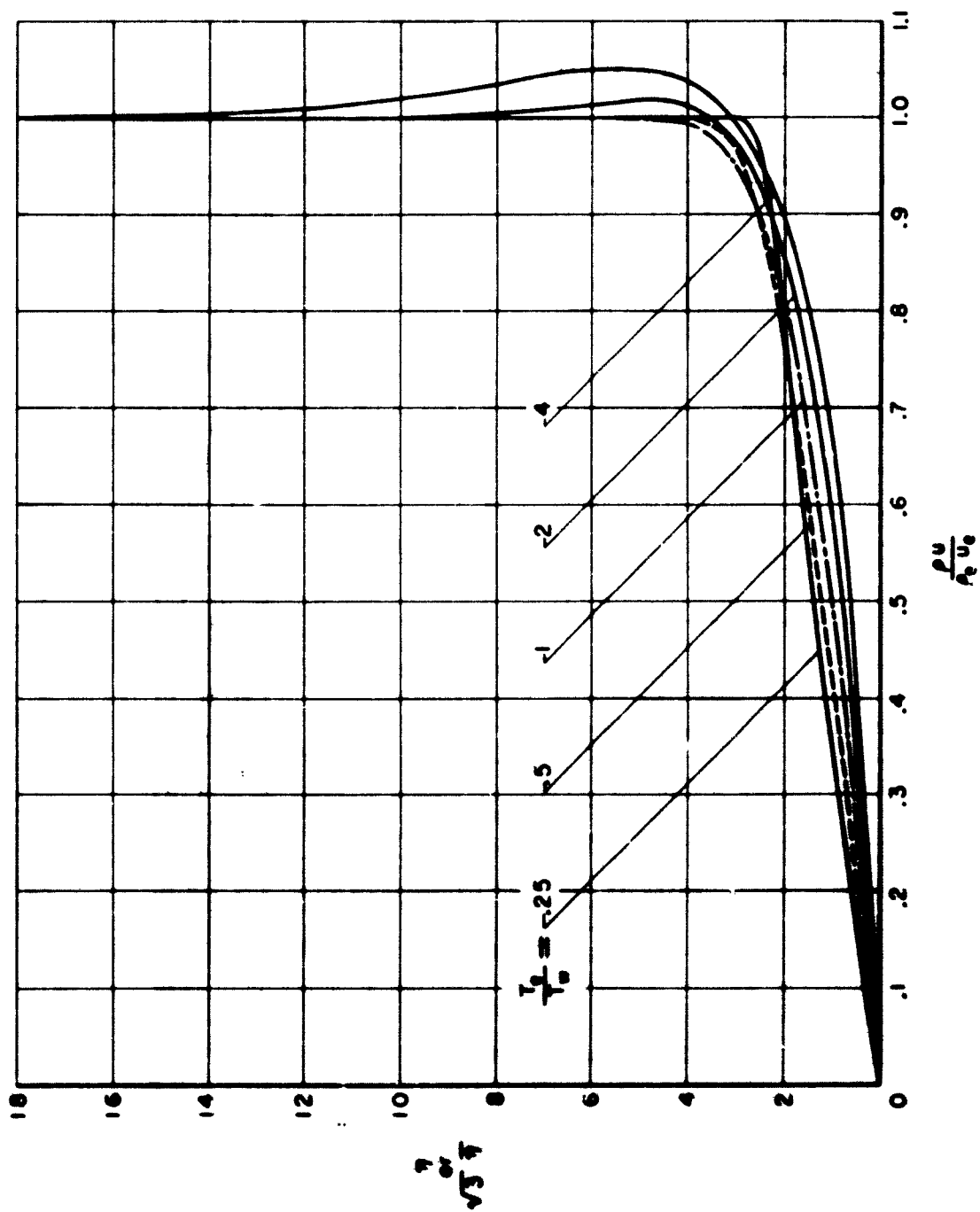


Figure 5.- Mass-flow profiles for  $f_v = -0.5$ .



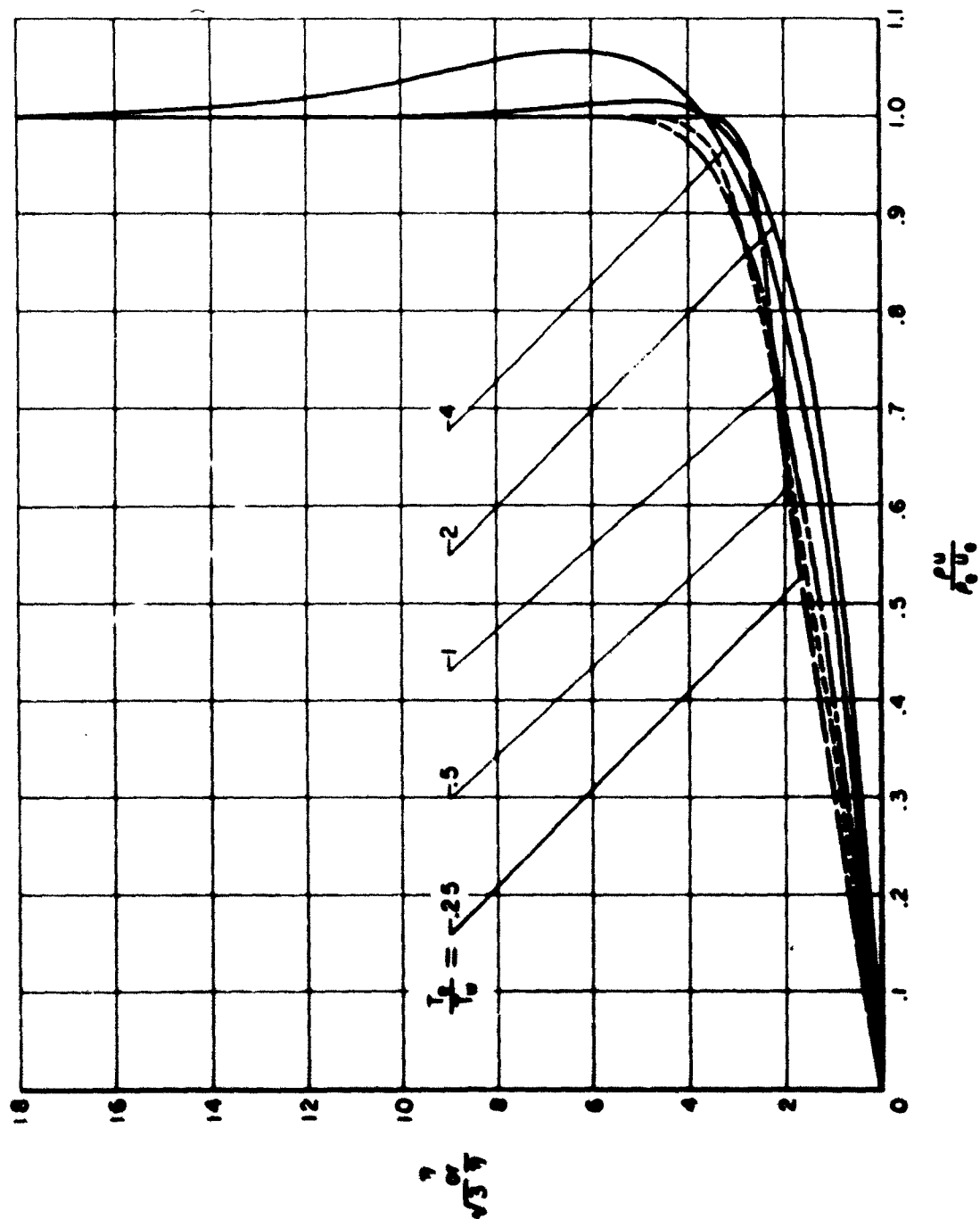


Figure 6.- Mass-flow profiles for  $f_w = -1.0$ .

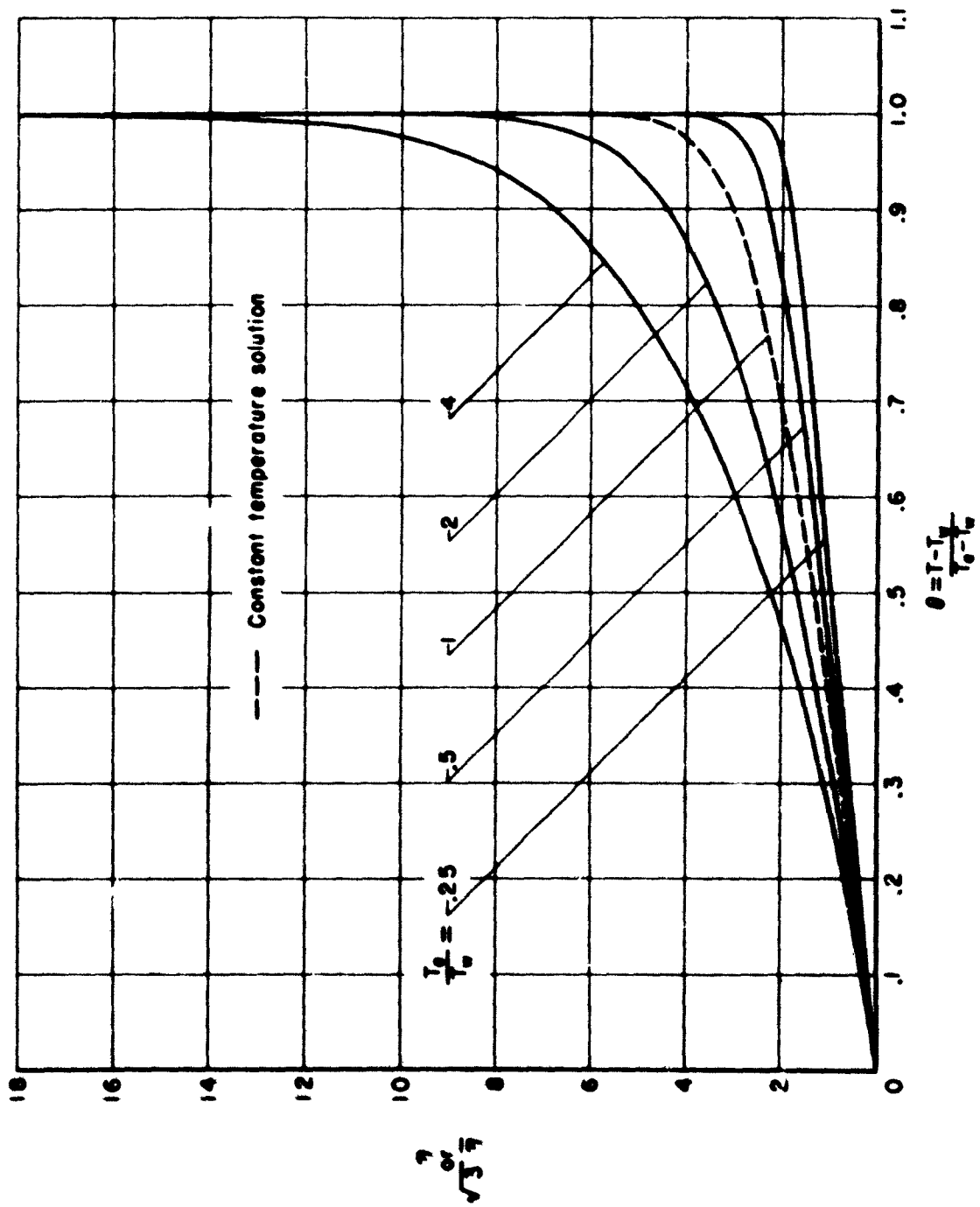


Figure 7.- Temperature profiles for  $f_W = 0$ .

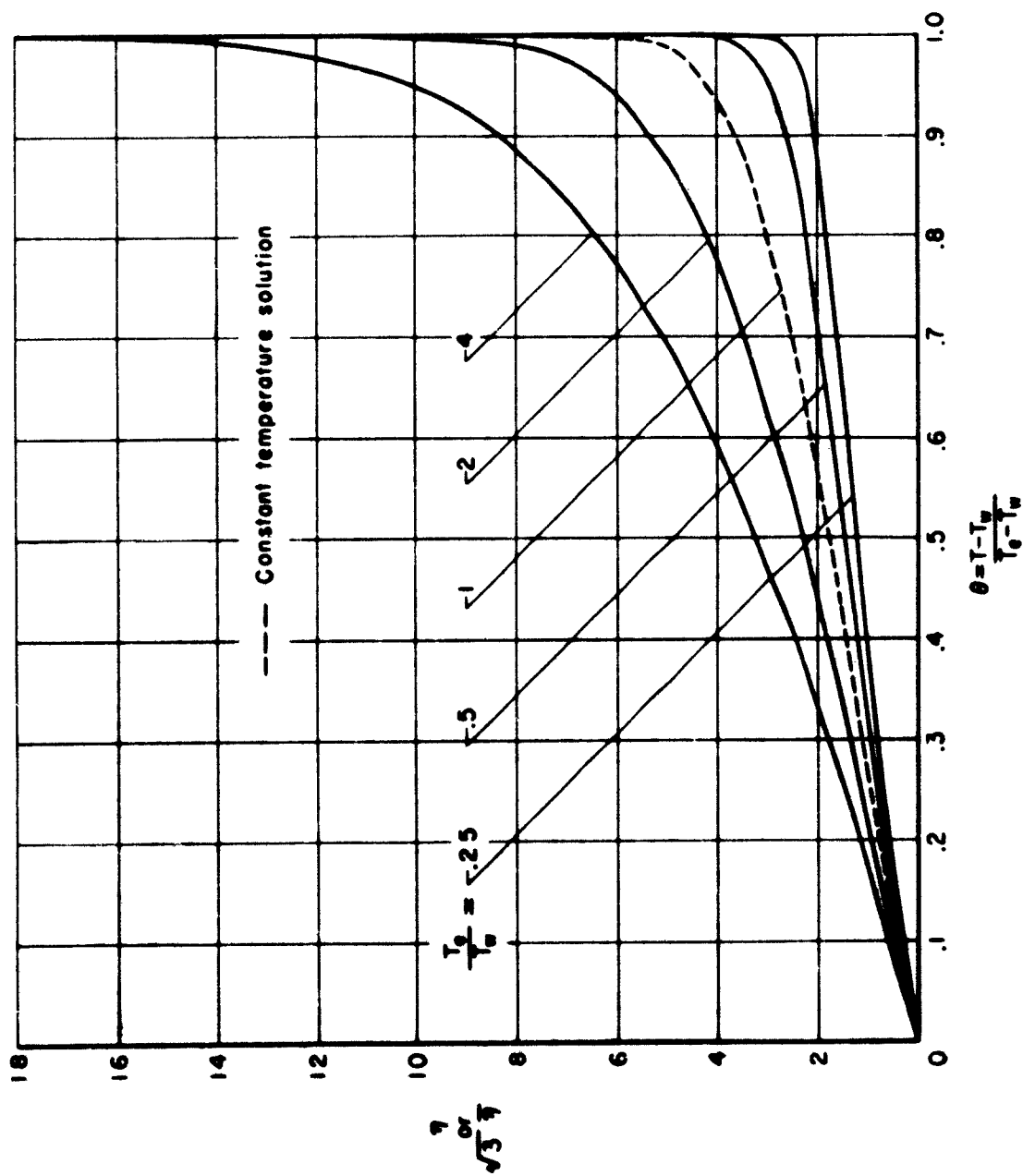


Figure 8.- Temperature profiles for  $f_W = -0.5$ .

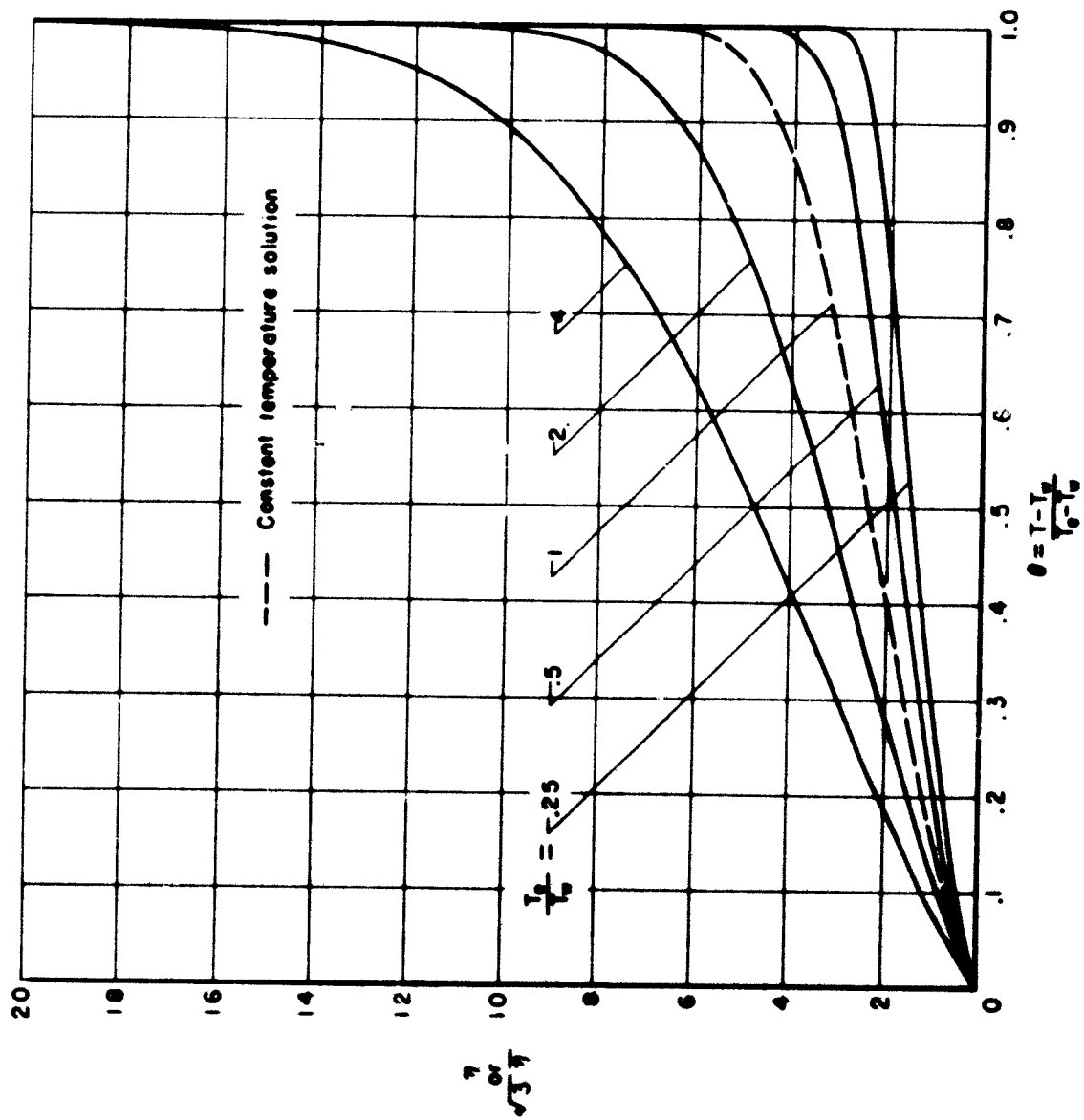


Figure 9.- Temperature profiles for  $f_V = -1.0$ .

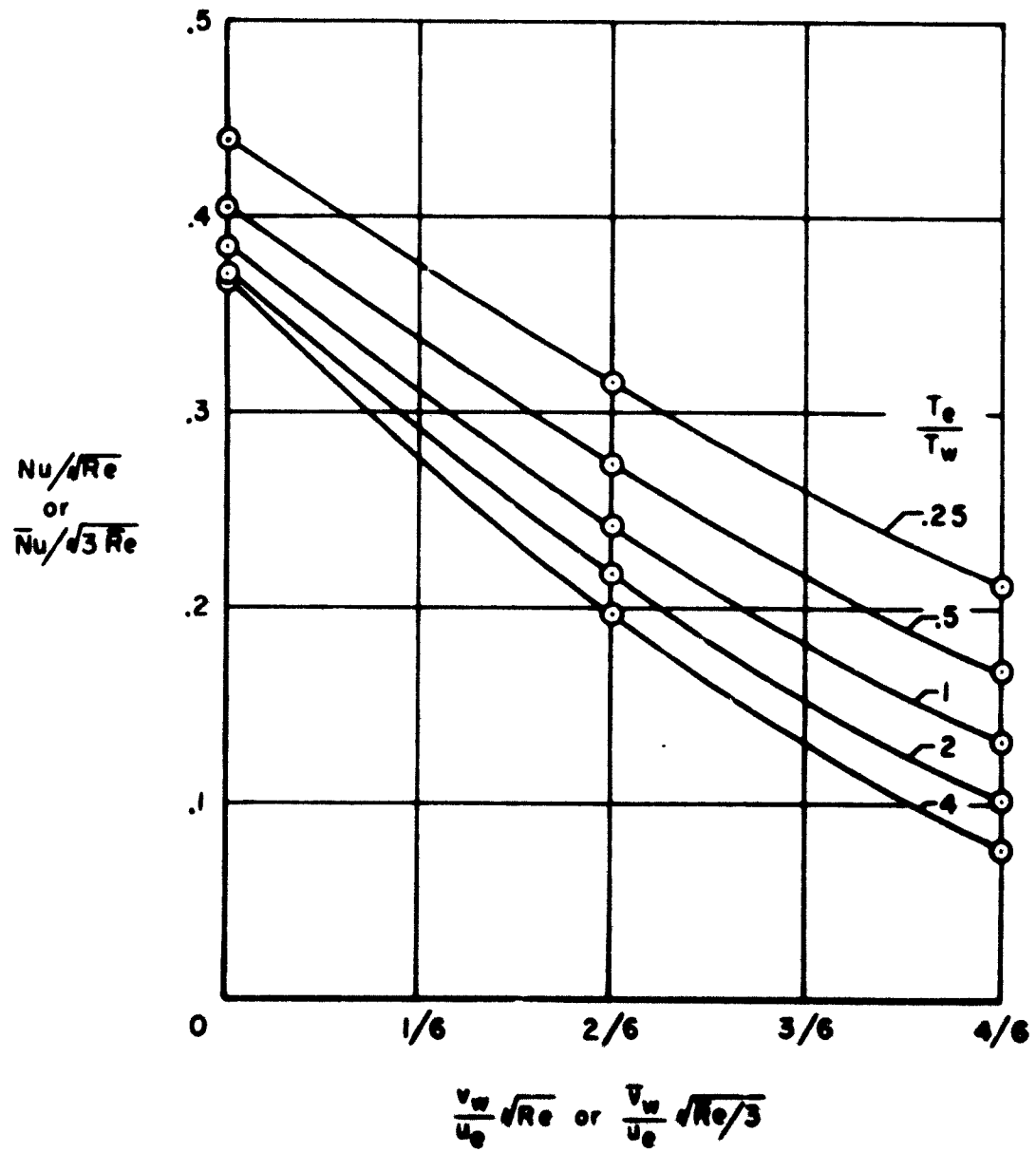


Figure 10.- The influence of transpiration and wall temperature level on the heat-transfer parameter.

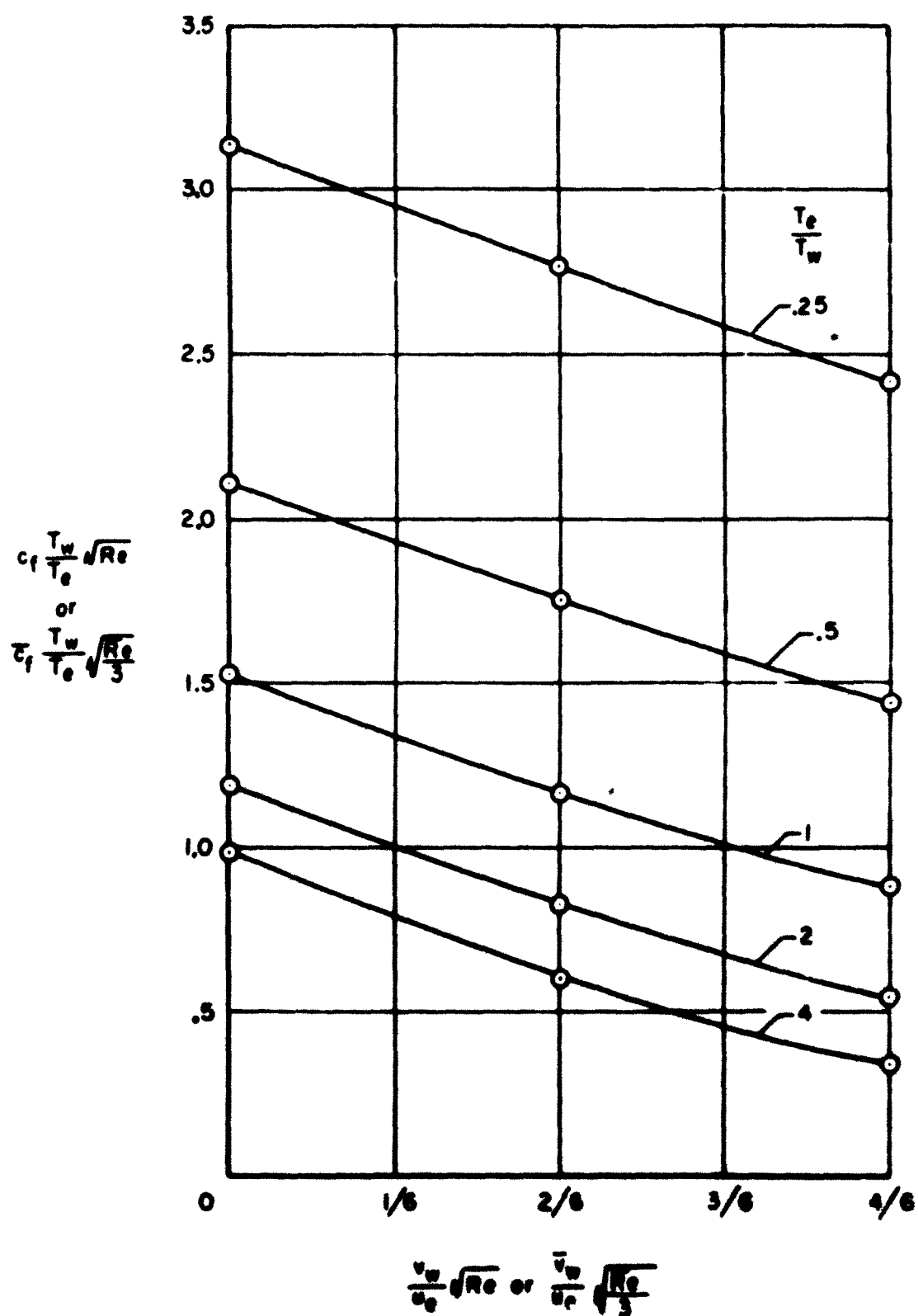


Figure 11.- The influence of transpiration and wall temperature level on the skin-friction parameter.